Ubuntu:Precise

From

Ubuntu 12.04 LTS (Precise Pangolin)

Introduction

- On April 26, 2012, Ubuntu 12.04 LTS (http://releases.ubuntu.com/precise/) was released.
- It is codenamed Precise Pangolin and is the successor to Oneiric Ocelot 11.10 (http://ubuntuguide.org/wiki/Ubuntu_Oneiric) (Oneiric+1).
- Precise Pangolin is an LTS (Long Term Support) release. It will be supported with security updates for both the desktop and server versions until April 2017.

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General Notes

General Notes

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- Ubuntu allows a user to accomplish tasks from either a menu-driven Graphical User Interface (GUI) (http://en.wikipedia.org/wiki/Graphical_user_interface) or from a text-based command-line interface (CLI) (http://en.wikipedia.org/wiki/Command-line_interface) . In Ubuntu, the command-line-interface terminal is called Terminal, which is started:

  Menu -> File -> Open Terminal

```
Text inside the grey dotted box like this should be put into the command-line Terminal.
```

- Many changes to the operating system can only be done by a User with Administrative privileges. 'sudo' elevates a User's privileges to the Administrator level temporarily (i.e. when installing programs or making changes to the system). Example:

```
sudo bash
```

- 'gksudo' can be used instead of 'sudo' when opening a Graphical Application through the "Run Command" dialog box or as a menu item. Example:

```
gksudo gedit /etc/apt/sources.list
```

    - Many file management tasks can be accomplished with root Administrative privileges by starting the Nautilus file manager in a similar fashion. (Use 'gksudo' if starting Nautilus from a menu item.)

```
gksudo nautilus
```

or

```
sudo nautilus
```

- "man" command can be used to find help manual for a command. For example, "man sudo" will display the manual page for the "sudo" command:

```
man sudo
```

- While "apt-get" and "aptitude" are fast ways of installing programs/packages, you can also use the Synaptic Package Manager, a GUI method for installing programs/packages. Most (but not all) programs/packages available with *apt-get install* will also be available from the Synaptic Package Manager. In this guide, when you see

```
sudo apt-get install package
```

you can search for *package* in Synaptic and install it that way.

- Many instructions use the text editor "nano" (which is universally available in Linux). However, it is often easier to use the text editor "gedit" in Ubuntu instead.
- "Menu" refers to the menu bar at the top (or bottom) of the desktop, akin to the Start menu in Microsoft Windows or the Menu bar of the Apple Macintosh.
- If you are using the 64-bit version, replace any "i386" with "amd64"

Other versions

How to find out which version of Ubuntu you're using

Open the command terminal and type:

```
lsb_release -a
```

How to find out which kernel you are using

```
uname -a
```

Newer Versions of Ubuntu

- Ubuntu has a six month release cycle, with releases in April and October.
- Raring Ringtail (13.04) was released in April 2013 and will be supported until December 2013.
- Quantal Quetzal (12.10) was released in October 2012 and will be supported until April 2014.

Older Versions of Ubuntu

- Lucid Lynx (10.04 LTS) (Server support (only) until April 2015)
- Oneiric Ocelot (11.10) (no longer supported)
- Natty Narwhal (11.04) (no longer supported)
- Maverick Meerkat (10.10) (no longer supported)
- Karmic Koala (9.10) (no longer supported)
- Jaunty Jackalope (9.04) (no longer supported)
- Hardy Heron (8.04 LTS) (no longer supported)
- Dapper Drake (6.06 LTS) (no longer supported)

- See this complete list of older and newer versions.

Other Resources

- Ubuntu Forums (http://ubuntuforums.org/) has a large community for online solutions and specific help.

Ubuntu Resources

Unity Desktop

Unity (http://en.wikipedia.org/wiki/Unity_%28desktop_environment%29) is the default desktop environment used in Ubuntu. It is compatible with the GTK platform used by Gnome. It was designed to be used for netbooks, but is developed by Canonical to be useful on all types of devices.

Gnome Project

Gnome3 (http://www.gnome.org/) is an alternative desktop available for Ubuntu, and a list of

Gnome projects (http://projects.gnome.org/) is available.

- Installation method 1 (https://launchpad.net/~gnome3-team/+archive/gnome3) :

```
sudo add-apt-repository ppa:gnome3-team/gnome3
sudo apt-get update
sudo apt-get dist-upgrade
sudo apt-get install gnome-shell
```

- Installation method 2 (https://launchpad.net/~ubuntugnometeam) :

```
sudo add-apt-repository ppa:ubuntugnometeam/gnome3
sudo add-apt-repository ppa:ubuntugnometeam/ppa-gen
sudo apt-get update
sudo apt-get install ugr-desktop-g3
sudo apt-get dist-upgrade
```

Ubuntu Screenshots and Screencasts

- What is Ubuntu? (http://www.ubuntu.com/ubuntu)
- Ubuntu 11.04 Unity Desktop (http://www.youtube.com/watch?v=HMztaKt_1_E) and other YouTube videos (http://www.youtube.com/results?search_query=ubuntu+11.04&aq=f) .

New Applications Resources

- GetDeb (http://www.getdeb.net) - Features the latest versions of software available from the official repositories as well as software not available in the official repositories. Available in easy-to-install .deb files (see Apt and Package Basics).
- Top 100 Open source Applications (http://ubuntulinuxhelp.com/top-100-of-the-best-useful-opensource-applications/)
- Linux Alternatives (http://www.linuxalt.com/)
- LinuxLink (http://www.linuxlinks.com/article/20080621060835773/GroupTests.html) provides "best in category" lists for Linux apps
- See our full list of add-on applications.

Other *buntu guides and help manuals

- Kubuntuguide (http://ubuntuguide.org/wiki/Kubuntuguide) -- Kubuntu uses the popular KDE (http://en.wikipedia.org/wiki/KDE) desktop environment
- Lubuntu (https://wiki.ubuntu.com/Lubuntu) -- Lubuntu can run with as little as 256 Mb RAM. It is better for older machines with limited resources.
- Edubuntu (http://www.edubuntu.org/Download) -- Edubuntu is a collection of software bundles optimized for use in educational environments. LTSP (thin client terminal server support) and many networking tools are bundled. A version for use with KDE (Kubuntu) is available.
- SkoleLinux / DebianEdu (https://wiki.debian.org/DebianEdu) -- a collection of (open-source) educational tools for Debian/Ubuntu Linux
- Ubuntu Doctors Guild (http://ubuntudoctorsguild.dyndns.org/) -- a collection of tips for using (K)Ubuntu Linux in health care environments

- official Ubuntu Server Guide (https://help.ubuntu.com/12.04/serverguide/C/index.html) -- a good starting reference for server packages

Installing Ubuntu

Warning: During installation from the LiveCD, there is an option to install the boot loader to */dev/sda*, which really installs the Grub2 boot loader to both the MBR (Master Boot Record) as well as the partition into which (K)Ubuntu will be installed. Pay careful attention during this step if your system uses a boot partition, uses multiple OS (more than 2), or chainloads bootloaders. For systems with such a boot partition, it is best NOT to overwrite the MBR. In this case, the boot loader should only be installed to the partition in which the (K)Ubuntu OS itself will be installed. (For example, if (K)Ubuntu will be installed to */dev/sda6*, then only install the boot loader to */dev/sda6*, not to */dev/sda*. The text based installer used in the Server and Alternate versions asks whether to install the bootloader into the MBR. Answer "no" to this question, and then proceed to install the bootloader to */dev/sda6* only.)

Hardware requirements

Ubuntu Precise Pangolin runs well with as little as 384 Mb RAM. (The GUI installer requires a minimum of 256 Mb RAM, while the alternative text-based installer can run using only 192 Mb RAM.) Netbooks can run Ubuntu Precise Pangolin, which has been optimised for that platform.

The installation takes between 3-4 Gb hard drive space, and 8 - 10 Gb will be needed to run comfortably. (However, at least 25-30 Gb will likely be needed for routine usage.)

If you have an older computer with less memory than this, consider Lubuntu (https://wiki.ubuntu.com/Lubuntu) (if 160 Mb RAM or greater), PuppyLinux (http://www.puppylinux.org/) (if 256 Mb or greater), or DSL (http://damnsmalllinux.org/) (if minimal RAM, limited hard drive space, running from a USBdrive, or running from within another OS).

Fresh Installation

- Download the latest ISO image from Ubuntu 12.04 LTS (http://releases.ubuntu.com/precise/) .

  See this guide (http://help.ubuntu.com/community/BurningIsoHowto) for burning the ISO image to a CD ("LiveCD").

  Use the LiveCD for installation.

- The Alternate CD version (http://releases.ubuntu.com/precise/) also allows the use of the same fast text-based installer used in the Server version (requiring less RAM), and there are more installation options than on the Desktop CD ("Regular Download").

- Another method involves installing the Server version first and then installing the Ubuntu desktop.

- A LiveCD can also be transferred to a USB flashdrive (using usb-creator-gtk) and the USB flashdrive then used to install Ubuntu on systems without CD drives. (Also see the Ubuntu Official documentation (http://www.ubuntu.com/download/help/create-a-usb-stick-on-ubuntu) or the Ubuntu Community documentation (http://help.ubuntu.com/community/Installation/FromUSBStick) .) Installing from USB is generally much faster than from a CD.
- If your computer, device, or hardware uses UEFI instead of a BIOS bootup system, then see this page.
- If your computer, device, or hardware uses Coreboot instead of a BIOS bootup system, then see this page.

Install a classic Gnome-appearing User Interface

- A Gnome 3.4 interface gnome-shell (http://live.gnome.org/GnomeShell) can be installed, and a choice (from the Login Manager) of running in Unity or Gnome 3 will then be available:

```
sudo apt-get install gnome-shell
```

- A user interface resembling the classic Gnome 2 interface (used in Ubuntu Lucid Lynx and earlier versions) can be installed. (This installs the gnome-shell modules as well.) A choice of running Unity or Gnome as the desktop environment will then be available from the Login Manager.

```
sudo apt-get install gnome-session-fallback
```

- A complete Ubuntu Gnome Shell Remix (http://ubuntu-gs-remix.sourceforge.net/p/home/) OS (an unofficial Ubuntu derivative) is also available from which the Unity desktop environment has been removed entirely, and is more similar to a Debian (http://wiki.debian.org/) distribution with a Gnome (http://www.gnome.org/gnome-3/) desktop.
- Of course, if you would like to use Ubuntu with the popular and powerful KDE (http://kde.org/applications/) desktop, use Kubuntu.

Dual-Booting Windows and Ubuntu

A user may experience problems dual-booting Ubuntu and Windows. In general, a Windows OS should be installed first, because its bootloader is very particular. A default Windows installation usually occupies the entire hard drive, so the main Windows partition needs to be shrunk, creating free space for the Ubuntu partitions. (You should clean up unnecessary files and defragment the drive before resizing.) See changing the Windows partition size.

After shrinking a Windows partition, you should reboot once into Windows prior to installing Ubuntu or further manipulating the partitions. This allows the Windows system to automatically rescan the newly-resized partition (using chkdsk in XP or other utilities in more recent versions

of Windows) and write changes to its own bootup files. (If you forget to do this, you may later have to repair the Windows partition bootup files manually using the Windows Recovery Console.)

Newer installations of Windows use two primary partitions (http://en.wikipedia.org/wiki/Disk_partitioning#PC_partition_types) (a small Windows boot partition and a large Windows OS partition). An Ubuntu Linux installation also requires two partitions -- a linux-swap partition and the OS partition. The Linux partitions can either be two primary partitions or can be two logical partitions within an extended partition. Some computer retailers use all four partitions on a hard drive. Unless there are two free partitions available (either primary or logical) in which to install Ubuntu, however, it will appear as if there is no available free space. If only one partition on a hard drive can be made available, it must be used as an extended partition (in which multiple logical partitions can then be created). Partition management can be done using the GParted utility.

If there are only two existing primary partitions on a hard drive (and plenty of free space on it) then there will be no problem installing Ubuntu as the second operating system and it is done automatically from the Ubuntu LiveCD. Allow the Ubuntu LiveCD to install to "largest available free space." Alternatively, if there is an extended partition with plenty of free space within it, the Ubuntu LiveCD will install to this "largest available free space" as well.

The main Windows partition should be at least 20 Gb (recommended 30 Gb for Vista/Windows 7), and a Ubuntu partition at least 10 Gb (recommended 20 Gb). Obviously, if you have plenty of disk space, make the partition for whichever will be your favoured operating system larger. For a recommended partitioning scheme, see this section.

Conversely you can install a retail version of Windows (but not an OEM or recovery version) after Ubuntu by creating a primary NTFS partition using GParted. (You may have to use GPparted from a Live CD/USB). Once the primary NTFS partition is created you can boot your Windows CD/DVD and choose to install Windows to that NTFS partition. When installation is complete, reboot to insure Windows boots properly. Once that is ascertained, use the Ubuntu Live CD/USB to install GRUB back to the MBR. (This is necessary because Windows overwrites the MBR and designates its own bootloader as the master bootloader.) Once GRUB is installed you will be able to boot either OS.

Alternatives include:

- Wubi (http://www.ubuntu.com/getubuntu/download-wubi) (Windows-based Ubuntu Installer), an officially supported dual-boot installer that allows Ubuntu to be run mounted in a virtual-disk within the Windows environment (which can cause a slight degradation in performance). Because the installation requires an intact functioning Windows system, it is recommended to install Ubuntu in this manner for short-term evaluation purposes only. A permanent Ubuntu installation should be installed in its own partition, with its own filesystem, and should not rely on Windows.
- EasyBCD (http://neosmart.net/dl.php?id=1) , a free Windows-based program that allows you to dual-boot Windows 7/Vista and Ubuntu (http://neosmart.net/wiki/display/EBCD/Ubuntu) (as well as other operating systems) by configuring the Windows 7/Vista bootloader.

Installing multiple OS on a single computer

Warning: During installation from the LiveCD, there is an option to install the boot loader to */dev/sda*, which really installs the Grub2 boot loader to both the MBR (Master Boot Record) as well as the partition into which (K)Ubuntu will be installed. Pay careful attention during this step if your system uses a boot partition, uses multiple OS (more than 2), or chainloads bootloaders. For systems with such a boot partition, it is best NOT to overwrite the MBR. In this case, the boot loader should only be installed to the partition in which the (K)Ubuntu OS itself will be installed. (For example, if (K)Ubuntu will be installed to */dev/sda6*, then only install the boot loader to */dev/sda6*, not to */dev/sda*. The text based installer used in the Server and Alternate versions asks whether to install the bootloader into the MBR. Answer "no" to this question, and then proceed to install the bootloader to */dev/sda6* only.)

If you want to install more than 2 operating systems on a single computer, check out these tips. Also see these tips regarding manipulating partitions.

Use Startup Manager to change Grub settings

Grub is a bootup utility that controls which OS to load by default and other bootup settings. You can change Grub settings from Startup Manager (http://sourceforge.net/projects/startup-manager/) , a GUI that is able to manage settings for Grub (Grub Legacy), Grub 2, Usplash, and Splashy. Also see the Ubuntu Community help (https://help.ubuntu.com/community /StartUpManager) page for Startup Manager usage instructions. Install:

```
sudo apt-get install startupmanager menu
```

Run:

> Menu -> System -> Administration -> Startup Manager

Note: You can also edit the Grub settings manually from the command-line interface.

Dual-Booting Mac OS X and Ubuntu

- Also see these tips for installing multiple OS.

Mac OS X has a similar structure to Linux (it is BSD Unix based). Dual-booting Mac OS X and Ubuntu detailed instructions can be found here (https://help.ubuntu.com/community/MacBook) .

Installing Mac OS X after Ubuntu

- If you decide to dual boot with OS X, choose ext2 as your partition type during the Ubuntu installation. (For this the Super Grub Disk CD is a useful utility. You can download the Super Grub .iso image file at forjamari.linex.org (http://supergrub.forjamari.linex.org) and burn the image to a CD-ROM.)
- Once you have installed Ubuntu, edit the Grub start-up list:

```
sudo nano /boot/grub/menu.lst
```

and add the following lines:

```
title Mac OS X
root (hd0,0)
makeactive
chainloader +1
```

Reboot your Mac and go to the terminal in Max OS X (if you have any issues booting, boot from your Mac OS X DVD). Press F8 and enter -s. Enter:

```
fdisk -e /dev/rdisk0
flag 2 <--note that flag 2 is my Mac partition number two
quit
y
reboot
```

- If are still unsure whether it is working correctly, use the Super Grub Disk CD and make grub active.

Installing Ubuntu after Mac OS X

- If you get an error message during boot such as HFS+error in the bootloader, you can also use the Super Grub Disk for recovering Linux GRUB and the Windows MBR (Master Boot Record).
- Once you have installed Ubuntu, edit the Grub start-up list:

```
sudo nano /boot/grub/menu.lst
```

and add the following lines:

```
title Mac OS X
root (hd0,0)
makeactive
chainloader +1
```

If you have issues with Mac OSX or Windows in GRUB, try changing the Mac OS X Grub entry

change root (hd0,0) to root (hd0,1)

This means you will boot into partition number 1. You can try any partition number until you get it right.

Upgrading from older versions

- Also see the Ubuntu desktop upgrade documentation (https://help.ubuntu.com/community/UpgradeNotes) and Precise upgrade documentation (specific to Ubuntu) (https://help.ubuntu.com/community/PreciseUpgrades) .

There are several methods for upgrades from the command-line interface (Konsole) (which can be used for both the desktop and server editions of Kubuntu/Ubuntu).

- This is the preferred method:

```
sudo apt-get install update-manager-core
sudo do-release-upgrade
```

- You can also use the update-manager (all editions):

```
sudo apt-get install update-manager
sudo update-manager -d
```

- You can also use:

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get dist-upgrade
```

(Note: the first two lines simply make sure your current distribution is current before upgrading the entire distribution, and are optional.

Always backup your system. Upgrades do not generally work for me, because I often make customizations to my older installations (to make my hardware work with them) but these customizations are often not required in the newest version. When the system then attempts to migrate my customizations (during an attempted upgrade), it often crashes my new system. (Fortunately, I always back up my important files, and reinstalling them on a fresh OS installation is therefore usually accomplished relatively quickly.) Here are some of the steps I have sometimes needed to take when performing upgrades.

- In general, upgrades must be done serially from one version to the next in order.

Reinstalling applications after a fresh installation

If you upgrade your Ubuntu system with a fresh installation, it is possible to mark the packages and services installed on your old system (prior to the upgrade) and save the settings ("markings") into a file. Then install the new version of Ubuntu and allow the system to reinstall packages and services using the settings saved in the "markings" file. For instructions, see this Ubuntu forum thread (http://ubuntuforums.org/showthread.php?t=1057608) . In brief:

- On the old system:

  Synaptic Package Manager -> File -> Save Markings

- Save the markings file to an external medium, such as a USB drive.
- Complete the backup of your system's other important files (e.g. the /home directory) before the installation of the new system.
- In the freshly-installed new system:

  Synaptic Package Manager -> File -> Read markings and load the file on your USB drive (or

other external storage) previously saved.

Note: Many packages, dependencies, and compatibilities change between version of Ubuntu, so this method does not always work. Automated updates remains the recommended method.

- Alternatively you can use this command-line method.
  - Prior to the clean installation. run:

```
dpkg --get-selections > ~/my-packages
```

    This creates a *my-packages* file in the ~ (home) directory which will contain a list of the packages installed on the old system. Copy this file to a safe place (as you will need it after the new installation).

  - Proceed with the clean installation. Enable the same repositories that were enabled in the old system.
  - Now copy the *my-packages* file to the ~ (/home) folder. Run:

```
sudo dpkg --set-selections < my-packages && sudo apt-get dselect-upgrade
```

    Any packages that you had installed (that are in the new repositories) will now be installed. Excluded will be any manually-installed packages (that are not in the new repositories) and any packages that were compiled from source.

- Here are some of the steps I have sometimes needed to take when performing upgrades.

Add Extra Repositories

Software packages and programs are freely available for download at multiple online sites with standardized structures, called repositories. There are repositories officially sanctioned and monitored by the Kubuntu/Ubuntu developer community, while other repositories are independently provided, without official sanction or supervision (and should be used with caution). Additional information is available from the Ubuntu Repository Guide (https://help.ubuntu.com/community/Repositories/Ubuntu) .

Types of Repositories

- There are four major package repository types in Ubuntu:
  - main - Supported by Canonical. This is the major part of the distribution.
  - restricted - Software not licensed under the GPL (http://en.wikipedia.org /wiki/GNU_General_Public_License) (or similar software license), but supported by Canonical.
  - universe - Software licensed under the GPL (or similar license) and supported by users.
  - multiverse - Software not licensed under the GPL (or similar license), but supported

by users.

- There are also these additional types of repositories:
  - Precise-updates - Updates to official packages.
  - Precise-backports - Current version software from Quantal Quetzal (Precise+1) that have been backported to Precise Pangolin.
  - Precise-proposed - Proposed updates & changes (bleeding edge stuff).

Third party repositories

Software developers often maintain their own repositories, from which software packages can be downloaded and installed directly to your computer (if you add the repository to your list). Many of these third party repositories and software packages have never been reviewed by the (K)Ubuntu/Debian community and can present a security risk to your computer. Trojans, backdoors, and other malicious software can be present at any unregulated repository. When using repositories not endorsed by the (K)ubuntu/Debian community, make sure you have utter confidence in that site before enabling the repository and installing a software package from it.

PPA repositories

A Personal Package Archive (PPA) is a special software repository used for experimental source packages still under development. Such software has not been approved by the Debian or Ubuntu developers (but may eventually become an accepted package). Use this software at your own risk just like any other third party repository software.

Documentation about how to install software from this type of repository can be found at the PPA Installing Software Guide (https://help.launchpad.net/Packaging/PPA/InstallingSoftware) .

In brief, to add a repository:

```
sudo add-apt-repository ppa:user/ppa-name
```

Note: If add-apt-repository is not available on your system, then install it with the package:

```
sudo apt-get install python-software-properties
```

Add Repositories using Synaptic Package Manager

This is the preferred method.

- Menu -> System -> Administration -> Synaptic Package Manager -> Settings -> Repositories.
- Here you can enable the repositories for Ubuntu Software and Third Party Software.
- For Third Party Software select Add -> enter the repository's address. It will have a format similar to:

```
deb http://archive.ubuntu.com/ubuntu/ precise main restricted
deb-src http://archive.ubuntu.com/ubuntu/ precise main restricted
```

- *Example:* To add the Medibuntu repository, Add:

```
deb http://packages.medibuntu.org/ precise free non-free
```

- Download the repository key to a folder.
  - *Example:* The Medibuntu key can be downloaded from http://packages.medibuntu.org/medibuntu-key.gpg
- Then add the key from:

  Menu -> System -> Administration -> Synaptic Manager -> Settings -> Repositories -> Authentication -> Import Key File...

- (Alternatively, you can manually add the key from the command line Terminal. See Add Repository keys.)

- Refresh the package list from the new repository:

  Synaptic -> Reload

Manually add repositories

- Adding a repository (such as a Launchpad ppa repository) can be accomplished from the command-line interface:

```
sudo apt-add-repository ppa:user/repository
```

where *ppa:user/repository* is an example of the repository you wish to add.

- When the repository name has a format similar to the following, enclose the repository name in quotation marks:

```
sudo apt-add-repository "deb http://repository.example.org precise stable"
```

- To remove a repository:

```
sudo apt-add-repository -r ppa:user/repository
```

- Download and add the repository keys to your keyring. See Add repository keys.
- Refresh the packages list from the new repositories:

```
sudo apt-get update
```

Note: If add-apt-repository is not available on your system, then install it with the package:

```
sudo apt-get install python-software-properties
```

Edit the repository sources list

- This is an optional, labor intensive method. Do this at your own risk. Modify the default Ubuntu sources.list only if you understand what you're doing. Mixing repositories can **break** your system. For more information see the Ubuntu Command-line Repository guide (https://help.ubuntu.com/community/Repositories/CommandLine) .
    - Create a backup of your current list of sources.

```
sudo cp -i /etc/apt/sources.list /etc/apt/sources.list_backup
```

Note: sudo - runs the command with root privileges. cp = copy. -i = prompt to overwrite if a file already exists.

- Edit the list of sources:

```
sudo nano /etc/apt/sources.list
```

or using a graphical editor:

```
gksudo gedit /etc/apt/sources.list
```

- Note: To use your local mirror you can add "*xx.*" before *archive.ubuntu.com*, where **xx** = your country code.
  Example: deb http://gb.archive.ubuntu.com/ubuntu precise main restricted universe multiverse indicates a repository for Great Britain (gb).

- Here is a sample sources.list. At the end have been added repositories for Medibuntu and Google:

```
#deb cdrom:[Ubuntu 12.04 _Precise Pangolin_ - Release i386]/ Precise main restricted
# See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
# newer versions of the distribution.

deb http://gb.archive.ubuntu.com/ubuntu/ precise main restricted
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise main restricted

## Major bug fix updates produced after the final release of the
## distribution.
deb http://gb.archive.ubuntu.com/ubuntu/ precise-updates main restricted
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise-updates main restricted

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team. Also, please note that software in universe WILL NOT receive any
## review or updates from the Ubuntu security team.
deb http://gb.archive.ubuntu.com/ubuntu/ precise universe
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise universe
deb http://gb.archive.ubuntu.com/ubuntu/ precise-updates universe
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise-updates universe

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team, and may not be under a free licence. Please satisfy yourself as to
## your rights to use the software. Also, please note that software in
```

```
## multiverse WILL NOT receive any review or updates from the Ubuntu
## security team.
deb http://gb.archive.ubuntu.com/ubuntu/ precise multiverse
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise multiverse
deb http://gb.archive.ubuntu.com/ubuntu/ precise-updates multiverse
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise-updates multiverse

## Uncomment the following two lines to add software from the 'backports'
## repository.
## N.B. software from this repository may not have been tested as
## extensively as that contained in the main release, although it includes
## newer versions of some applications which may provide useful features.
## Also, please note that software in backports WILL NOT receive any review
## or updates from the Ubuntu security team.
deb http://gb.archive.ubuntu.com/ubuntu/ precise-backports main restricted universe multiverse
deb-src http://gb.archive.ubuntu.com/ubuntu/ precise-backports main restricted universe multiverse

## Uncomment the following two lines to add software from Canonical's
## 'partner' repository. This software is not part of Ubuntu, but is
## offered by Canonical and the respective vendors as a service to Ubuntu
## users.
deb http://archive.canonical.com/ubuntu precise partner
deb-src http://archive.canonical.com/ubuntu precise partner

deb http://security.ubuntu.com/ubuntu precise-security main restricted
deb-src http://security.ubuntu.com/ubuntu precise-security main restricted
deb http://security.ubuntu.com/ubuntu precise-security universe
deb-src http://security.ubuntu.com/ubuntu precise-security universe
deb http://security.ubuntu.com/ubuntu precise-security multiverse
deb-src http://security.ubuntu.com/ubuntu precise-security multiverse

## Medibuntu - Ubuntu 12.04 "Precise Pangolin"
## Please report any bug on https://bugs.launchpad.net/medibuntu/
deb http://packages.medibuntu.org/ precise free non-free
deb-src http://packages.medibuntu.org/ precise free non-free

# Google software repository
deb http://dl.google.com/linux/deb/ stable non-free
```

- Download and add the repository keys to your keyring. See Add repository keys.
- Refresh the packages list from the new repositories:

```
sudo apt-get update
```

Add repository keys

- Download the gpg keys for the repositories and automatically add them to your repository keyring:
  - *Example:* To obtain and add the Medibuntu repository key:

```
wget --quiet http://packages.medibuntu.org/medibuntu-key.gpg -O - | sudo apt-key add -
```

  - *Example:* To obtain and add the Google repository key:

```
wget --quiet http://dl.google.com/linux/linux_signing_key.pub -O - | sudo apt-key add -
```

Note: wget - retrieves a file from a network location. --quiet = no output. -O = Output downloaded item to terminal. The | (pipe symbol) is used to capture the output from the previous command (in our case the screen) and use it as an input for the piped command (i.e. apt-key, which adds it to the keyring).

- Alternatively (and perhaps more easily), you can use apt-key directly:

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys KEY
```

where KEY is the missing key code printed in apt-get output, e.g. EF4186FE247510BE.

Note: Key servers often use port 11371. Make sure your firewall allows port 11371 to be open.

Package Installation and Updates

Apt and Package Basics

- Read Add Extra Repositories

Most new users will use the Synaptic Package Manager to install packages. These instructions are for installing packages from the command-line Terminal. Terminal can be started:

Menu -> Applications -> Accessories -> Terminal

- Install packages:

```
sudo apt-get install packagename
```

- *Example:*

```
sudo apt-get install mpd sbackup
```

- Remove packages:

```
sudo apt-get remove packagename
```

- To remove all dependencies:

```
sudo apt-get autoremove
```

- *Example:*

```
sudo apt-get remove mpd sbackup
```

- Search for packages:

```
apt-cache search <keywords>
```

- *Examples:*

```
apt-cache search Music MP3
apt-cache search "Text Editor"
```

- Update the apt package database after adding/removing repositories:

```
sudo apt-get update
```

- Upgrade packages:

```
sudo apt-get upgrade
```

- Upgrade the entire distribution (e.g. from Maverick to Natty):

```
sudo apt-get dist-upgrade
```

Installing .deb packages

Debian (.deb) packages are the packages that are used in Ubuntu. You can install any .deb package in your system. .deb files can generally be installed from your file manager (Nautilus) merely by clicking on them, since file associations with the default installer is already set in Ubuntu. These instructions are for those who wish to install packages from the command-line terminal (Terminal).

- Install a downloaded Debian (Ubuntu) package (.deb):

```
sudo dpkg -i packagename.deb
```

- Remove a Debian (Ubuntu) package (.deb):

```
sudo dpkg -r packagename
```

- Reconfigure/Repair an installed Debian (Ubuntu) package (.deb):

```
sudo dpkg-reconfigure packagename
```

**Example:*

```
sudo dpkg-reconfigure mpd
```

Handling (Tar/GZip) and (Tar/Bzip2) archives

(Tar/GZip) archives end in ".tar.gz" and (Tar/Bzip2) archives end in ".tar.bz2". Bzip2 is the newer, more efficient compression method. These files can generally be automatically extracted by merely clicking on them from your file manager (Nautilus), since file associations with the appropriate archival utilities are set by default in Ubuntu. These instructions are for those who wish to use the command line Terminal.

- To extract:

```
tar xvf packagename.tar.gz
```

Note: tar is an application which can extract files from an archive, decompressing if necessary.

-x means extract.
-v means verbose (list what it is extracting).
-f specifies the file to use.

- Decompressing ".gz" files

```
gunzip file.gz
```

- Decompressing ".bz2" files

```
bunzip2 file.bz2
```

Note: You can also decompress a package first by using the command gunzip (for .gz) or bunzip2 (for .bz2), leaving the .tar file. You would then use tar to extract it.

- To create a .gz archive:

```
tar cvfz packagename.tar.gz folder
```

- To create a .bz2 archive:

```
tar cvfj packagename.tar.bz2 folder
```

Installing a package from source

- Make sure you have all the necessary development tools (i.e. libraries, compilers, headers):

```
sudo apt-get install build-essential linux-headers-$(uname -r)
```

Note: "uname -r" lists the current kernel you are using

- Extract the archive that contains the source files:

```
tar xvf sourcefilesarchive.tar.gz
```

- Build the package using the package's script (in this case the configure script), compile the package (make), and install the compiled package into your system (make install):

```
cd /path/to/extracted/sourcefiles
./configure
sudo make
sudo make install
```

Note: typing ./ before a filename in the current folder allows the Linux shell to try and execute the file as an application even if it is not in the path (the set of folders which it searches when you type a command name). If you get a "permission denied" error, the file is not marked as being executable. To fix this:

```
sudo chmod +x filename
```

Example: In the above instructions, configure is the shell script to build the package from source. To be sure the configure script is executable:

```
sudo chmod +x configure
```

Create a .deb package from source files

If your build from source is successful, you can make a Debian (Ubuntu) package (.deb) for future use:

- Install package tools:

```
sudo apt-get install checkinstall
```

- Rebuild package using "checkinstall":

```
cd /path/to/extracted/package
./configure
sudo make
sudo checkinstall
```

- Keep the resulting ".deb" file for future use. It can later be installed using:

```
sudo dpkg -i packagename.deb
```

Note: These are basic instructions that may not always work. Some packages require additional dependencies and optional parameters to be specified in order to build them successfully. Also see these Ubuntu wiki instructions (https://wiki.ubuntu.com/PackagingGuide /Basic?action=show&redirect=HowToBuildDebianPackagesFromScratch) . More info about .deb package structure can be found here (http://www.ibm.com/developerworks/linux/library

/l-debpkg.html) .

Aptitude

Aptitude is a terminal-based package manager that can be used instead of apt-get. Aptitude marks packages that are automatically installed and removes them when no packages depend on them. This makes it easy to remove applications completely. To use Aptitude, replace apt-get with aptitude in the command line. Example:

```
sudo aptitude install packagename
sudo aptitude remove packagename
sudo aptitude update
sudo aptitude upgrade
```

For an ncurses-based graphical user interface, type

```
sudo aptitude
```

For more information, see the aptitude documentation (http://people.debian.org/~dburrows /aptitude-doc/en/) .

Synaptic Package Manager

While "apt-get" and "aptitude" are fast ways of installing programs/packages, you can also use the Synaptic Package Manager (Menu -> System -> Administration -> Synaptic Manager), a GUI method for installing programs/packages. Most (but not all) programs/packages available with apt-get install will also be available from the Synaptic Package Manager. This is the preferred method for most desktop users. In this guide, when you see

```
sudo apt-get install package
```

you can simply search for *package* in Synaptic and install it that way.

Menu -> System -> Administration -> Synaptic Package Manager

- Search for the name of the program/package. You can also search for a word in its description.

-> Mark for Installation -> Apply

- The selected program(s) will be automatically installed, along with its dependencies.

Ubuntu Software Center (Add/Remove Programs)

Not all packages available from apt-get, aptitude, and Synaptic Package Manager are available in the Ubuntu Software Center. However, it is the easiest interface for new users of Ubuntu and directs them to preferred packages.

Menu -> Applications -> Ubuntu Software Center

- Search for the sort of program you want to add. Example: type *MP3* to see a list of

mp3 software.

-> Mark for Installation -> Apply

- The selected program(s) will be automatically installed.

Manual Updates

- Read General Notes
- Read Add Extra Repositories
- Manually, from Terminal (command line interface):

```
sudo apt-get update
sudo apt-get upgrade
```

or

- Use Synaptic Package Manager:

  Menu -> System -> Administration -> Synaptic Package Manager -> "Reload" then "Mark all upgrades"

  If there are packages available for updating, you will be prompted whether to install them.

Automated Updates

- Use Synaptic Package Manager:

  Menu -> System -> Administration -> Synaptic Manager -> Settings -> Preferences -> General -> Reloading Outdated Package Information -> Automatic

Repair broken packages

If a package installation fails (which can cause a Package Manager to freeze or become locked), or if a package has unsatisfied dependencies causing a similar condition, then run one (or both) of the following commands from the command-line terminal:

```
sudo apt-get install -f
sudo dpkg --configure -a
```

- If a problem occurs with MergeList (appearing as a missing "Package: header" error):

```
E: Encountered a section with no Package: header
E: Problem with MergeList...
E: The package lists or status file could not be parsed or opened.
```

then repair by recreating the package lists:

```
sudo rm /var/lib/apt/lists/* -vf
sudo apt-get update
```

- If a problem occurs with a lock on the apt cache, for example:

```
E: Could not get lock /var/cache/apt/archives/lock - open (11: Resource temporarily unavailable)
```

  then run:

```
sudo fuser -cuk /var/lib/dpkg/lock; sudo rm -f /var/lib/dpkg/lock
sudo fuser -cuk /var/cache/apt/archives/lock; sudo rm -f /var/cache/apt/archives/lock
```

File Managers

- For FTP (http://en.wikipedia.org/wiki/File_Transfer_Protocol) (online File Transfer Protocol):
  - See this section on FTP clients for information about FileZilla.
  - See this section on FTP servers for information about vsftp and proftp.
    Also see these FTP tips.
- For WebDAV (http://en.wikipedia.org/wiki/WebDAV) (online folders):
  - See this section on WebDAV for information about both WebDAV servers and clients.
- For MTP (http://en.wikipedia.org/wiki/Media_Transfer_Protocol) (Media Transport Protocol), used for transferring data (by USB) to some storage devices:
  - See this section.

Nautilus

- Nautilus (https://live.gnome.org/Nautilus) is the default file manager in Ubuntu (Gnome).

Desktop Add-ons

There are many add-on icons, themes, wallpapers, 3-D effects, and other customizations available for the GNOME desktop.

Gnome Eye-Candy Resources

- Gnome Look (http://www.gnome-look.org) has wallpapers, splash screens, icons, and themes for windows managers (including Metacity and Compiz) and other applications.

Ubuntu Wallpaper

- Download free Maverick Meerkat wallpapers (https://wiki.ubuntu.com/Artwork/Incoming/Maverick) .

Change Plymouth Splash Screen

This is the initial splash screen you see at bootup. Different Plymouth themes can be found by searching for plymouth-theme in a Package Manager. Install a new one and then:

```
sudo update-alternatives --config default.plymouth
sudo update-initramfs -u
```

and manually select the theme you wish to use.

Plymouth does not reliably work with nVidia drivers and during bootup a blank screen may result for several seconds.

Metacity

Metacity is the default desktop compositing manager in Gnome. It is lightweight, streamlined and does not have many configurable options, but has multiple themes available at Gnome Look.

Compiz Fusion

Compiz Fusion is available as a separate Windows Manager, to allow advanced desktop effects such as the rotating cube desktop. Many Ubuntu users choose to run Compiz, which is quite fast in Ubuntu. Install:

```
sudo apt-get install compiz compizconfig-settings-manager compiz-fusion-plugins-main compiz-fusion-plugins-extra em
```

To change to Compiz as the Window Manager:

- Select Compiz Configuration:

  Menu -> System -> Preferences -> CompizConfig Settings Manager

  Note: You must logout and log back in for the change to take effect.

Fusion Icon

Fusion Icon is a tray icon that allows you to easily switch between window managers, window decorators, and gives you quick access to the Compiz Settings Manager. This allows quick toggling of 3-D desktop effects (that may not be compatible with some applications).

```
sudo apt-get install fusion-icon
```

Menu -> Applications -> System Tools -> Compiz Fusion Icon

You can then easily access CompizConfig Settings Manager from the icon.

Rotate the Compiz Cube

Set the CompizConfig Settings Manager to enable the "Desktop Cube" and "Rotate Cube" and "Viewport Switcher" options. Click on the icon for each to customize settings. For example, to change the appearance of the cube, click on the Desktop Cube icon to access its settings. You can set the hotkey buttons for rotating the cube in the "Viewport Switcher" settings. Otherwise, hold down the Ctrl+Alt+Left mouse button and drag the mouse (or touchpad) the direction you want to rotate the cube.

Remember, the cube rotates between desktops. It's not a cube unless you have at least 4 desktops running. You will not get a cube if you are only using 2 desktops (you will get a "plate"). You can still rotate the sides of the plate, of course, but it will not be a cube. (Recent users from the Windows OS may have no experience with the concept of simultaneous desktops, but they are nice once you learn how to use them).

When running Compiz fusion as the Windows Manager, you must change the default number of desktops from within CompizConfig Settings Manger. To enable 4 desktops:

> CompizConfig Settings Manager -> General -> General Options -> Desktop Size -> Horizontal Virtual Size -> 4

When you start an application, you can assign it to any one of the 4 desktops by right-clicking the upper left corner of the application window and choosing the "To Desktop..." option. Rotating the cube shows the different desktops. You can also go to a desktop using the taskbar icon which shows the 4 desktops.

Emerald

Emerald is the theme engine for Compiz Fusion. Multiple themes are available. (These themes originated from the Beryl project before it merged with Compiz to form Compiz Fusion.) The Emerald Theme Manager for Compiz Fusion can be installed:

```
sudo apt-get install emerald
```

Google Desktop

Google Desktop for Linux (http://googledesktop.blogspot.com/) was a proprietary suite of Google widgets and applications. It was discontinued in September 2011.

gDesklets

gDesklets (http://gdesklets.de/) are similar to Windows widgets and Google gadgets and provide information such as weather, system resources, and news primarily for the Gnome desktop (i.e. Ubuntu Maverick and older). Install:

```
sudo apt-get install gdesklets
```

Dock applications

Avant Window Manager, Cairo Dock, gnome-do and Wbar are dock-like applications for Ubuntu Linux. A dock represents running programs as icons at the bottom of the screen (as is done on the Mac OS X desktop), instead of by toolbar panel segments (as is done in Windows and other Linux window managers). See this brief comparison of dock applications (http://linuxowns.wordpress.com/2008/05/08/the-best-and-worst-docks-for-ubuntu/) .

Avant Window Navigator

- Avant Window Navigator (http://wiki.awn-project.org/) requires that a desktop composition manager (such as Metacity, Compiz, Xcompmgr, KDE4 (Kubuntu), or xfwm4 (Xubuntu)) be installed and running.
- Install and upgrade proprietary nVidia or ATI graphics drivers so that the compositing manager functions properly.
- Install AWN:

```
sudo apt-get install avant-window-navigator awn-manager
```

  (Note: If you are using Gnome (Ubuntu) and do not already have a compositing manager installed (such as Compiz), Metacity will be installed as part of the installation.)

- Enable automatic startup of AWN at bootup:
  - Menu -> System -> Preferences -> Startup Applications -> Add...

```
avant-window-navigator
```

- Select which applets should run from the dock menu by default:
  - Menu -> Applications -> Accessories -> Avant Window Navigator Manager

  You can drag application icons onto the list, then activate or deactivate the applets from the list.

Cairo Dock

Cairo Dock (http://developer.berlios.de/projects/cairo-dock/) can be used either with a desktop compositing manager (such as Metacity for Gnome, Compiz, or the KDE4 Window Manager) or without one. See the Ubuntu installation instructions (https://help.ubuntu.com/community/CairoDock) for details. It is available from the repositories:

```
sudo apt-get install cairo-dock cairo-dock-plug-ins
```

Gnome Do

Gnome Do (http://do.cooperteam.net/) is a docking utility for Gnome. Install:

```
sudo apt-get install gnome-do
```

- From the preferences pane of gnome-do select the Docky look and feel to get the dock (rather than the default Quicksilver-like) look and feel.

wbar

wbar (http://code.google.com/p/wbar/) is a quick-launch bar (not a dock) that has an appearance similar to Avant Window Manager and Cairo Dock. It is GTK (Gnome) based but can work in all desktop environments. It does not require a compositing manager to be installed and is therefore quicker and more suitable for low-end hardware systems. It is the default in the Google gOS desktop and is available as a .deb package from Google. Download and install (from the command-line Terminal):

```
wget http://wbar.googlecode.com/files/wbar_1.3.3_i386.deb
sudo dpkg -i wbar_1.3.3_i386.deb
```

- Start wbar with custom start options (e.g. by pressing alt+F2). Here is an example:

```
wbar -isize 48 -j 1 -p bottom -balfa 40 -bpress -nanim 3 -z 2.5 -above-desk
```

Here is another example:

```
wbar -above-desk -pos bottom -isize 60 -nanim 1 -bpress -jumpf 0.0 -zoomf 1.5
```

For a full list of command-line startup options, see:

```
wbar --help
```

Tip: If you want the "wave" effect just increase the -nanim value. I like the icons to just pop up so I don't use it, but with 9 icons 5 there is a nice "wave" effect.

Obviously, you could create a menu item with the command line options (similar to the examples above), or a batch file that can be automatically started at system startup (as a cron event or startup session).

You can also change wbar startup options by editing the configuration file:

```
sudo gedit /usr/share/wbar/dot.wbar
```

See this example configuration file (http://ubuntuforums.org/showthread.php?t=980565) . However, not all options are able to be set from the configuration file and must be run from the command line. For more info see this wbar guide (http://linux-guider.blogspot.com/2008/09/wbar-another-cute-dock.html) .

wbarconf

A simple wbar configuration utility (http://gnomefiles.org/content/show.php/wbarconf?content=131999) can be downloaded as a .deb package and installed:

```
wget http://koti.kapsi.fi/~ighea/wbarconf/wbarconf_0.7.2-1_i386.deb
sudo dpkg -i wbarconf_0.7.2-1_i386.deb
```

Virtualization

Virtualization allows a second operating system (OS), such as Windows or OS X, to be run from within (K)Ubuntu. This requires extra RAM (because both (K)Ubuntu and the virtualized second OS require separate amounts of RAM) and a license for the second OS. If you wish to run a virtualized instance of Windows XP, for instance, you must have a license for Windows XP.

VirtualBox

VirtualBox (http://www.virtualbox.org/) is a fast and complete virtualization solution that was owned and maintained by Sun Microsystems (now bought by Oracle). There is a free and fully open-source edition available under the GNU GPL license.

- Install the open-source edition:

```
sudo apt-get install virtualbox-ose virtualbox-ose-source virtualbox-guest-additions
```

- You can also add the QT-version (if using KDE/Kubuntu, for example):

```
sudo apt-get install virtualbox-ose-qt
```

- Start VirtualBox:

  Menu -> VirtualBox OSE PC virtualization solution

For usage instructions, see the End-user documentation (http://www.virtualbox.org/wiki/End-user_documentation) . For information on installing Virtualbox in Windows so that Ubuntu can then be installed within in a virtual machine running in Windows, see this page.

Proprietary versions of VirtualBox

A few additional features (http://www.virtualbox.org/wiki/Editions) that are not yet in the OSE version, such as a USB device interface, are available in the proprietary version of VirtualBox. To install a proprietary edition (http://www.virtualbox.org/wiki/Linux_Downloads) of VirtualBox:

- Add the security key:

```
wget -q http://download.virtualbox.org/virtualbox/debian/oracle_vbox.asc -O- | sudo apt-key add -
```

- Add the repository string to your repository list and update:

```
echo "deb http://download.virtualbox.org/virtualbox/debian maverick non-free" | sudo tee /etc/apt/sources.list.d/vi
sudo apt-get update
```

- Install:

```
sudo apt-get install virtualbox
```

VMWare

VMWare (http://www.vmware.com/) is a commercial virtualization platform that currently offers two free products: VMWare Player and VMWare Server (http://www.vmware.com /download/server/) (the latter with a free renewable yearly license). VMWare Player can play virtual appliances that have already been created, whereas VMWare Server (which has a broader range of features) allows the creation of virtual machines. In general, VMWare Server is recommended unless you only need to play an appliance. (Appliances will also run in VMWare Server). Users that wish to run servers (or processes) that need to be available to a network from within the virtual machine should use VMServer. If you wish to install a new OS within a virtual machine (other than in an appliance), you will need VMWare Server.

VMWare Player

Installation instructions are on the website, or at the Ubuntu community wiki (https://help.ubuntu.com/community/VMware/Player) . In brief, to install the free VMWare Player:

- Install pre-requisites:

```
sudo apt-get install build-essential linux-headers-$(uname -r)
```

- Get the binary package/installation script, give it executable privileges, then run the installation script:

```
wget http://download3.vmware.com/software/vmplayer/VMware-Player-2.5.3-185404.i386.bundle
chmod +x VMware-Player-2.5.3-185404.i386.bundle
sudo ./VMware-Player-2.5.3-185404.i386.bundle
```

- Run:

  Menu -> Applications -> System Tools -> VMWare Player

Create an Ubuntu Appliance

While any edition of Ubuntu can be installed in a virtual machine, the minimal installation option (F4) of the Ubuntu Server creates a highly-efficient edition (previously known as JeOS) optimised for use within a virtual appliance (which can then be played using VMWare Player or other virtual machine client). See this walkthrough.

A virtual appliance for VMWare Player (using this JeOS minimal server) can also be built using

vmbuilder (https://help.ubuntu.com/10.04/serverguide/C/jeos-and-vmbuilder.html) .

VMWare Server

- Install pre-requisites:

```
sudo apt-get install build-essential linux-headers-$(uname -r)
```

- Download the server source files for your architecture (32-bit or 64-bit) from the VMWare Server website (http://www.vmware.com/download/server/) and retrieve your license key by email.
- Extract the files, give execution privileges to the install script, and run the install script:

```
tar xvf VMware-server-2.0.1-156745.i386.tar.gz
cd vmware-server-distrib
chmod +x vmware-install.pl
sudo ./vmware-install.pl
```

VMWare Package

VMWare Appliances (that include an Ubuntu/Debian OS) can be created using VMWare Server and the VMWare Package utility. These appliances can then be deployed to users who can play them using VMWare Player. Install:

```
sudo apt-get install vmware-package
```

Keyboard errors in VMware guest

After installing VMWare 6.5, and installing a guest OS, the Function, arrow and Del/End/etc keys do not function. This is a bug with VMWare´s code. Add this line to ~/.vmware/config (create file if necessary) to fix this issue:

```
xkeymap.nokeycodeMap = true
```

KVM

KVM (http://www.linux-kvm.org/page/Main_Page) is the free open source virtualization solution implemented as a Linux kernel module (in the recent kernels) for computers whose processors contain virtualization extensions (Intel VT or AMD-V). See the Ubuntu installation instructions (https://help.ubuntu.com/community/KVM/Installation) . Install:

```
sudo apt-get install kvm
```

Qemu (without KVM)

If your computer does not have the virtualization extensions, you can still run the QEMU

(http://wiki.qemu.org/) virtualization platform. See this Ubuntu community documentation (https://help.ubuntu.com/community/WindowsXPUnderQemuHowTo) . It can be installed from source code (http://www.qemu.org/qemu-doc.html#SEC82) .

Xen

Xen (http://www.xen.org/) is an efficient open-source virtualization ("hypervisor") platform (which includes a merge with QEMU). It is the basis for the Amazon EC2 Cloud and is generally intended for use on a server (or on "baremetal" systems, i.e. no OS yet installed). It is free open source under a GPL license. The latest desktop (and installation instructions) is available from the website. (A commercial version is also offered by Citrix.) Implementation in Ubuntu requires some modification, currently. For more info, see the Ubuntu community documentation (https://help.ubuntu.com/community/Xen) . Install:

```
sudo apt-get install xen-hypervisor xen-docs convirt
```

A Xen virtual machine host can also be installed automatically with certain 64-bit CPUs, using the 64-bit Ubuntu Server LiveCD. (A (K)Ubuntu desktop can then later be added -- see Ubuntu server).

Virtual Machine Manager

Virtual Machine Manager (http://virt-manager.et.redhat.com/) is an application to allow viewing of all instances of virtual machines on your system. It includes a secure implementation of VNC. This and other virtual management tools are available as an integrated package in (K)Ubuntu. Install:

```
sudo apt-get install ubuntu-virt-mgmt
```

Crossover for Linux

Codeweavers' Crossover Office for Linux (http://www.codeweavers.com/products/cxlinux/) is a subscription-based commercial package that allows many Windows programs to be run on Ubuntu without the need for a Microsoft OS license or a complete virtualization system. See the website for more info. Codeweavers releases older versions of this product into the free package Wine.

Wine

Wine (http://www.winehq.org/) is a free open-source package that is similar to (and implements many elements of) CrossOver for Linux. Like CrossOver for Linux, no Microsoft license or virtualization platform is required to run Windows programs. See these instructions (http://www.winehq.org/download/deb) for installing the latest version of Wine.

```
sudo apt-get install wine
```

Also consider installing Microsoft's TrueType fonts:

```
sudo apt-get install ttf-mscorefonts-installer
```

PlayOnLinux

PlayOnLinux (http://www.playonlinux.com/) is a Wine frontend which simplifies the installation and launch of many Windows programs, particularly games. Install:

```
sudo apt-get install playonlinux
```

Internet Explorer 7

Internet Explorer 7 can be installed with PlayOnLinux. Select "Internet Explorer 7" from the "Internet" section of PlayonLinux.

Internet Explorer 6 & 7

Internet Explorer 6 & 7 can function under Wine, albeit imperfectly. For most purposes, Firefox can be used (with the User Agent Switcher plugin) to mimic Internet Explorer.

- Make sure you have Wine and cabextract packages:

```
sudo apt-get install wine cabextract
```

- Download the Winetricks (http://wiki.winehq.org/winetricks) installation script:

```
wget http://winetricks.org/winetricks
sudo chmod +x winetricks
```

- Install with winetricks:

```
sh winetricks ie6
sh winetricks ie7
```

Note: Winetricks is automatically installed with the current version of Wine (http://www.winehq.org/download/deb) .

Netflix in Wine package

- See this section.

Transgaming Cedega

Cedega (http://www.transgaming.com/) is a commercial application (similar to CrossOver Office and Wine), for installing and running some Windows applications, specifically games, without the need for virtualization or a Microsoft license. It provides 3D support, software acceleration

support, and a high level of DirectX support. Installation instructions are found on the website.

Mono

Mono (http://www.mono-project.com/Main_Page) is a free open source project sponsored by Novell to allow .NET programs to function in Linux ((K)Ubuntu) and Mac OS X. . Several GNOME applications (like Tomboy, F-Spot, and Banshee) require mono to be installed, so mono may already be installed by default on your system. The most recent version is available here (http://www.mono-project.com/Other_Downloads) .

```
sudo apt-get install mono-2.0-devel
```

Moonlight

- See Moonlight plugin for Firefox

Java

- Install the Java Runtime Environment version 6 (the *default-jre* package points to the *open-jdk6-jre* package):

```
sudo apt-get install default-jre
```

or

```
sudo apt-get install open-jdk6-jre
```

- Alternatively, install the Java Runtime Environment version 7:

```
sudo apt-get install open-jdk7-jre
```

- If you really need to use Oracle (ex Sun) Java instead of OpenJDK in (K)Ubuntu then install from the PPA private repository using the instructions found here (http://www.webupd8.org/2012/01/install-oracle-java-jdk-7-in-ubuntu-via.html) .

DosBox

DOSBox (http://www.dosbox.com/) is a DOS-emulator that emulates CPU:286/386 realmode/protected mode, Directory FileSystem/XMS/EMS, Tandy/Hercules/CGA/EGA/VGA/VESA graphics, and a SoundBlaster/Gravis Ultra Sound card (for sound compatibility with older games). You can "re-live" classic games that otherwise won't run on newer computers.

```
sudo apt-get install dosbox
```

ScummVM

ScummVM (http://scummvm.org/) allows certain classic graphical point-and-click adventure games to run (provided you already have their data files). ScummVM replaces the executables shipped with the games, allowing play on Linux operating systems (for which they were not originally designed).

```
sudo apt-get install scummvm
```

Google Android

Also see this page.

Android-x86 in VirtualBox

Android-x86 (http://www.android-x86.org/documents/installhowto) can can be downloaded as an .iso image and installed to and run in Virtualbox (or QEMU, VMWare, or other virtual environment). It provides a fast, efficient emulation environment with a large display but some functions and apps will not work with it.

- See here for more details.

Android SDK emulator

Android SDK for Linux (http://developer.android.com/sdk/index.html) is a 32-bit Android emulator/software development kit. It incorporates a QEMU virtual machine framework as part of its installation. It provides a resource-hungry, slow, but largely functional Android environment and apps can be installed from (and run within) the emulator.

- Once the Android emulator SDK is installed, install an app using these ADB instructions (http://developer.android.com/guide/developing/tools/adb.html) or directly from within an app marketplace.
- More detailed instructions are available here.

F-Droid app repository for Android

- F-Droid (http://f-droid.org) is the repository for free and open source software (almost all of it ad-free) for the Google Android platform.

Edutainment Applications

There are many superb applications that can be installed with a single click.

Menu -> Applications -> Ubuntu Software Center-> Education

Below are a few examples that can be installed from this menu:

- Mnemosyne (http://www.mnemosyne-proj.org/) -- a flash-card tool
- Oregano (http://arrakis.gforge.lug.fi.uba.ar/) -- a program for electrical engineering schematics
- RlPlot (http://rlplot.sourceforge.net/) -- a high quality graph generator
- K3DSurf (http://k3dsurf.sourceforge.net/) -- a program for modeling 3,4,5, and 6 dimensional models.
- Gramps (http://gramps-project.org/) -- map your family-tree and co-operate with genealogy projects

Games

There are some phenomenal games for (K)Ubuntu Linux.

- Ubuntu Community Wiki -- Games (https://help.ubuntu.com/community/Games) .
- Rangit's Best Linux Games (http://rangit.com/linux/best-game/)
- Unixmen's Must-Play Linux Games (http://www.unixmen.com/10-must-play-linux-games-for-2012/) .

- In addition, Steam (http://store.steampowered.com/browse/linux/) now offers (for sale) game clients for Linux. Examples include Amnesia (http://store.steampowered.com /app/57300/) , Trine 2 (http://store.steampowered.com/app/35720/) , and Leisure Suit Larry (http://store.steampowered.com/app/231910/) .

There are hundreds of free, open-source games available in (K)Ubuntu. Most (including the KDE Games (http://www.kde.org/applications/games/) collection and the Gnome Games (http://live.gnome.org/GnomeGames/) collection) can be accessed through the Games section of your Package Manager.

Examples are:

- PouetChess (http://pouetchess.sourceforge.net/) -- an excellent 3-D chess game (sudo apt-get install pouetchess)
- PokerTH (http://www.pokerth.net/) -- a very nice Texas Hold 'Em Poker (sudo apt-get install pokerth)
- Kajongg (http://kde.org/applications/games/kajongg/) -- a real MahJongg game, for humans and/or robots (sudo apt-get install kajongg)
- Planet Penguin Racer (http://en.wikipedia.org/wiki/Tux_Racer) -- Penguin slides down a 3-D luge run, catching fish. (Extreme Tux Racer (http://sourceforge.net/projects /extremetuxracer/) is the newer, updated version -- sudo apt-get install extremetuxracer)
- KsirK (http://games.kde.org/game.php?game=ksirk) -- play Risk against the computer or in a multiplayer environment (sudo apt-get install kdegames)
- Racer (http://www.racer.nl/) -- the 3-D "real deal" Car Racing game (install binary found here (http://www.racer.nl/dl_beta_linux.htm)). Also with extra tracks and add-ons (http://www.racer.nl/dl_content.htm) .
- TORCS (http://torcs.sourceforge.net/) -- the 3-D Car Racing game (sudo apt-get install torcs)
- Supertuxkart (http://supertuxkart.sourceforge.net/) -- the go-kart racing game (sudo apt-get install supertuxkart)
- Pingus (http://pingus.seul.org/) -- a Lemmings clone (similar to Super Mario Bros.) that uses

penguins instead of lemmings (sudo apt-get install pingus)
- Frozen Bubble (http://www.frozen-bubble.org/) -- the bubble-popping game (sudo apt-get install frozen-bubble)
- Gweled (http://gweled.org/) -- a Bejeweled clone, simple in implementation yet almost as addicting (sudo apt-get install gweled)
- Frets on Fire (http://fretsonfire.sourceforge.net/) -- similar to Guitar Hero. You can import songs from Guitar Hero (http://www.geetarfreaks.webs.com/Viva%20La%20Music.html) and from community sites (http://fretsonfire.wikidot.com/custom-songs) (sudo apt-get install fretsonfire)
- Scorched3d (http://www.scorched3d.co.uk/) -- turn-based artillery game in a 3D rendered landscape (sudo apt-get install scorched3d)
- Pyscrabble (http://pyscrabble.sourceforge.net/) (and pyscrabble-server) -- online Scrabble game and server (sudo apt-get install pyscrabble pyscrabble-server) (Also see Lexulous (http://www.lexulous.com) and the Internet Scrabble Club (http://www.isc.ro/) for browser-based online games similar to Scrabble. Internet Scrabble Club requires Java: sudo apt-get install default-jre . It also requires firewall port 1325 to be open inbound/outbound.)

Wing Commander Privateer

The Linux version of this free version of Wing Commander (http://priv.solsector.net/) can be downloaded as a binary here (http://sourceforge.net/projects/privateer/) . It is a DOS program that runs in DosBox.

Vdrift

Vdrift (http://vdrift.net/) is a free open source 3-D racing game, similar to Need for Speed, with realistic physics, multiple drift tracks, and multiplayer games. Support for joysticks, mice and keyboard is included. A binary package for Linux is available from the website.

Action

Incredible action games (including those from the Top 25) are available in Ubuntu. Many can be installed using:

> Menu -> Applications -> Ubuntu Software Center -> Games

Examples are:

- Alien Arena (http://icculus.org/alienarena/rpa/about.html) -- a multi-player first person shooter action game with free servers. (Package: alien-arena) (Server: alien-arena-server)
- OpenArena (http://www.openarena.ws/) -- an open-source multi-player first person shooter action game, with free servers. (Package: openarena) (Server: openarena-server)
- Tremulous (http://www.tremulous.net) -- a Halo-like multiplayer first person shooter action game. The repositories have the current version. (Package: tremulous) (Server: tremulous-server)
- Sauerbraten (http://sauerbraten.org/) - a multiplayer graphics-rich first person shooter game evolved from Cube. (Package: sauerbraten) (Server: sauerbraten-server)
- Nexuiz (http://www.alientrap.org/nexuiz/) -- an open-source multi-player first person

shooter game with free servers and tournaments. (Package: nexuiz) (Server: nexuiz-server) A 35 map add-on community pack is also available here (http://www.alientrap.org/nexuiz/downloads.php) . To install it, extract the map pack to /home/*username*/.nexuiz/data (or ~/.nexuiz/data).

Note: Many of these games require advanced graphics. Make sure you have the necessary hardware drivers activated.

UrbanTerror

UrbanTerror (http://www.urbanterror.net) is a multiplayer first person shooter action game (with an integrated server). It uses the open-source quake 3 engine and features many real weapons and free-to-use servers for multi-player functionality. "Not recommended for adolescents in Germany." Download and install the binary using these instructions (http://www.urbanterror.info/docs/texts/110/) .

Doom

Skulltag, ZDoom (http://zdoom.org/wiki/Compile_ZDoom_on_Linux) , and PrBoom (Freedoom) are versions of Doom2. For Doom3, see Doom3 on Ubuntu (https://help.ubuntu.com/community/Doom3) .

Skulltag

Skulltag (http://skulltag.net/wiki/Installation_for_Ubuntu) is an updated version of ZDoom (http://zdoom.org/wiki/Compile_ZDoom_on_Linux) that includes network play. It is now known as Zandronum (http://wiki.zandronum.com) . See the Zandronum wiki (http://wiki.zandronum.com/Install_Zandronum_on_Ubuntu) for simple (K)Ubuntu installation instructions. (You can use the Freedoom Iwad (http://www.nongnu.org/freedoom/download.html) (see below) if you don't have an original Doom2.wad.) Note: Most of the modules require dependencies from the Universe repositories. Make sure you have the Universe repositories enabled (Synaptic Package Manager -> Settings -> Repositories -> Edit Software Sources -> Community-maintained Open Source software (universe) -> (ticked)).

- Add the skulltag repositories, update, and install Zandronum and DoomSeeker (the Zandronum online server utility):

```
echo "deb http://debian.drdteam.org/ stable multiverse" | sudo tee /etc/apt/sources.list.d/zandronum.list
sudo apt-get update
sudo apt-get install zandronum doomseeker-zandronum
```

- If you don't have a doom2.wad, tnt.wad, or plutonia.wad already, you can copy the freedoom.wad (http://www.nongnu.org/freedoom/download.html) to your ~/*wads* folder:

```
mkdir ~/wads
cd ~/wads
wget http://savannah.nongnu.org/download/freedoom/freedoom-iwad/freedoom-iwad-latest.zip
unzip freedoom-iwad-latest.zip
cp freedoom*/doom2.wad .
rm freedoom-iwad-latest.zip
```

- Configure Doomseeker to use the ~/*wads* directory for IWADS and PWADS.
- If you wish to use Midi for sound (optional), install some prerequisites :

```
sudo apt-get install timidity timidity-interfaces-extra
```

- If you need more help (regarding the Zandronum-server, firewalls, and port forwarding with Zandronum/Skulltag, for example), see these additional tips.
- Zandronum/Skulltag runs on any platform, with any graphics, and on almost any computer. There are thousands of add-ons, maps, and gameplay modes, giving a nearly endless variety of gameplay. The interface makes obtaining and playing the modifications very easy. This is my favorite game of all time (and I have been playing it for years).

PrBoom

PrBoom (http://prboom.sourceforge.net/) is a free open source port of the original first person shooter action game, Doom2 (http://en.wikipedia.org/wiki/Doom_II) . It does not have the advanced options of ZDoom. Freedoom is a free Iwad (set of maps) to replace the original Doom2.wad.

```
sudo apt-get install prboom freedoom timidity timidity-interfaces-extra
```

There are thousands of extra maps (Wads) (http://www.doomworld.com/10years/bestwads/) available for this game. It is easiest to keep a directory for your wads in your home directory:

```
mkdir /home/user/wads
```

or alternatively, use the /usr/share/games/doom folder, giving universal privileges to the folder:

```
chmod -R 777 /usr/share/games/doom
```

Place your doom2.wad, tnt.wad, or plutonia.wad (from your original game) into this folder. If you don't have one, you can copy the Freedom version of doom2.wad from /usr/share/games /freedoom into this folder. Place any new .wad's you have downloaded from the Internet into this folder as well. Then run the game using both the original iwad map as well as your new .wad map (you will only see the new map).

```
prboom -iwad /home/user/wads/doom2.wad -file /home/user/wads/new_wad.wad
```

Note: Only doom2.wad, tnt.wad, or plutonia.wad can be used as an iwad. You must have one of these in addition to any new wad you wish to use. When in doubt, use doom2.wad.

Note: this game can also be installed using Menu -> Applications -> Ubuntu Software Center -> Games as Freedoom, but you must also install timidity and timidity-interfaces-extra.

MMORPG

Spring

The Spring Project (http://spring.clan-sy.com/) is a scripting engine platform to develop and play free multiplayer games such as Star Wars Imperial Winter (http://www.imperialwinter.com/) and Zero-K (http://zero-k.info/) . Install:

```
sudo apt-get install spring
```

Regnum Online

Regnum Online MMPORG (http://www.regnumonline.com.ar/index.php?sec=6&l=1) -- see basic installation instructions (http://ubuntuforums.org/showthread.php?t=615246) and the help forum (http://www.regnumonline.com.ar/forum/forumdisplay.php?f=15) as needed.

PlaneShift

PlaneShift (http://www.planeshift.it/) is a free full-immersion online fantasy game (MMPORG). Client downloads and patches are available here (http://www.planeshift.it/download.html) .

- Make the downloaded binary installation file executable:

```
cd /directory_where_downloaded
chmod +x PlaneShift-v0.5.4-x64.bin
```

- Run the executable binary as root (this must be done from the command line Terminal):

```
sudo ./PlaneShift-v0.5.4-x64.bin
```

- Follow the instructions for installation. When prompted whether to manually set permissions, answer "no."
- During installation, most users have recommended installing this game to your /home directory as a single user installation, instead of to /opt for all users. This avoids permissions problems. I was able to install to /opt, but it takes some effort.
- Make sure your user belongs to the games group:

  Menu -> System -> Administration -> Users and Groups -> *user* -> Manage Groups -> *games* -> Properties -> Group Members -> *user* (*ticked*) -> OK

- Register for a free account at PlaneShift Registration (http://www.planeshift.it /register.html) .
- If you installed the game to the menu, it will be in

  Menu -> Applications -> Lost & Found -> Client and Setup

To run it from the menu, I had to edit the menu entries by checking the box: "Run in terminal."

Alternatively, run it from the command-line Terminal:

```
sudo /opt/PlaneShift/pssetup
sudo /opt/PlaneShift/psclient
```

Notes: This game ran very slowly for me on a 32-bit installation with a DSL connection and I gave up. The 64-bit installation worked better.

Game Emulators

DosBox (DOS emulator)

- DosBox is a DOS emulator that enables older DOS programs (and games) to be run. Install:

```
sudo apt-get install dosbox
```

- Tweak the DosBox settings (http://www.dosbox.com/wiki/Dosbox.conf#Linux) if necessary. For more info, read the DosBox instructions (*man dosbox* in a command-line terminal).

Dolphin (Wii emulator)

The Dolphin emulator (http://wiki.dolphin-emu.org) is an open-source cross-platform Wii emulator that allows many Wii game disks to be run on many operating systems. (Whether the Wii Netflix disk will run under the Dolphin emulator has not yet been established.) (The Dolphin-emulator has no relationship to the KDE Dolphin file manager). Installation instructions for building the latest version from source code are here (http://code.google.com/p/dolphin-emu/wiki/Linux_Build) . Alternatively (and more easily), a Debian (.deb) package for 64-bit (K)Ubuntu systems can be installed (after downloading) from this location (http://dolphin-emu.org/download/) .

Other Emulators

- Zsnes (http://www.zsnes.com/) is a Super Nintendo game emulator. It is a 32-bit package, so will require a 32-bit system to be installed first when run on a 64-bit system (sudo apt-get install ia32-libs ia32libs-multiarch). Install:

```
sudo apt-get install zsnes
```

- Desmume (http://desmume.org/) is a Nintendo DS emulator. Install:

```
sudo apt-get install desmume
```

- PCSX (http://pcsx-df.sourceforge.net/) is a Sony Playstation emulator. Install:

```
sudo apt-get install pcsxr
```

- VisualBoyAdvance (http://vba.ngemu.com/) is a GameBoy Advance emulator (and vbaexpress is a GUI frontend). Install:

```
sudo apt-get install visualboyadvance vbaexpress
```

- GnuBoy (http://code.google.com/p/gnuboy/) is a GameBoy emulator. Install:

```
sudo apt-get install gnuboy-x
```

- The Emilia Pinball (http://pinball.sourceforge.net/) emulator is a pinball game emulator. Install:

```
sudo apt-get install pinball
```

Internet Applications

Internet applications enable you to make full use of your Internet connection. Web browsers, Email clients, Instant Messengers, and more are included in this category.

Web Browsers

Mozilla Firefox

Mozilla Firefox (http://www.mozilla.com/en-US/) is the ubiquitous web browser. Based on open source components, it is trademarked and cannot be altered or re-distributed with any change that involves the name or trademarks. Install the current version:

```
sudo apt-get install firefox
```

Firefox Plug-ins

The Firefox web browser supports a wide variety of third-party add-ons, extensions, and plug-ins. They are referred to as "plug-ins" in this guide (the original term) but many are found and configured under the "extensions" or "add-ons" tabs in Firefox (once they are installed).

> Firefox -> Tools -> Add-ons -> Extensions (or Plug-ins)

Adblock Plus plug-in (block ads in a web page)

Adblock Plus (http://adblockplus.org/en/) blocks ads that appear in web pages. It is an important tool to limit tracking and undesirable website elements, as well. You can subscribe to a free filter service, and can add to the block list individual ads and website elements with a single click.

```
sudo apt-get install xul-ext-adblock-plus
```

- You can also add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> AdBlock Plus. (This method will also ensure that automatic updates are installed by Firefox.)
- Recent versions of Adblock Plus allow the display of a large number of "partner" ads unless you disable this undesirable behavior:

  Firefox -> Tools -> Add-ons -> Adblock Plus -> Preferences -> Filter preferences... -> Allow some non-intrusive advertising (*unticked*)

Because Adblock Plus appears to now be creating holes in its own blocking service, it is probably worthwhile to stop automatic updates and only update Adblock Plus selectively (in case the developers in the future decide to create even more holes in the plug-in's blocking capability without the corresponding option to disable the behavior).

NoScript plug-in (controls scripts)

The NoScript (http://noscript.net/) plugin is considered one of the most important security measures for browsing the Internet. Most viruses and trojans gain access to computers from the Internet through scripts. This plugin allows you to choose which scripts to allow and blocks the rest.

- Add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> NoScript. (This method will also ensure that automatic updates are installed by Firefox.)
- NoScript has a long of websites on its "whitelist." It is important to review this list and remove the websites for which you don't wish to automatically allow scripts (I remove them all).

  Firefox -> Tools -> Add-ons -> NoScript -> Preferences -> Whitelist
- A large number of websites use multiple locations/URLs to assemble their webpage content, a process which is blocked by NoScript's ABE (Application Boundaries Enforcer) function. I have found it necessary to disable ABE in order for most of my websites to function correctly.

  Firefox -> Tools -> Add-ons -> NoScript -> Preferences -> Advanced -> ABE -> Enable ABE (*unticked*)
- Many websites now use aggressive pop-ups to place advertising in front of the actual content. While NoScript can block these ads, there will be a "placeholder" still blocking the content unless you turn off the placeholders:

  Firefox -> Tools -> Add-ons -> NoScript -> Preferences -> Embeddings -> Show placeholder icon (*unticked*)
- Most websites use scripting extensively these days, so that you may need to "Allow" a website in NoScript. To block the individual undesirable elements of the website, use

AdBlock Plus.

Bookmark Favicon Changer plug-in

In the newest versions of Firefox, there are some bugs regarding the Favicons (the small icons that appear in the address bar) and the Bookmark icons. This plug-in will restore the icons that get erased (leaving a blank dotted box) or allow you to choose your own Favicons / Bookmark icons.

- Add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> Bookmark Favicon. (This method will also ensure that automatic updates are installed by Firefox.)

RefreshBlocker plug-in (prevents redirects)

RefreshBlocker (https://addons.mozilla.org/en-US/firefox/addon/refreshblocker/) allows the user to decide which websites (and pages) will be allowed to redirect (based on META tags within the webpage). Although Firefox (as of version 3.5) blocks all directs by default, the behavior is not customizable; it is therefore preferable to turn off the Firefox redirect control and use RefreshBlocker instead.

- Add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> RefreshBlocker. (This method will also ensure that automatic updates are installed by Firefox.)
- Turn off the Firefox automatic redirect blocker:

  Firefox -> Enter *about:config* in the browser location bar -> *right-click* on "accessibility:blockautorefresh" -> **Toggle** to change the value from *true* to *false*

Video DownloadHelper plug-in for Firefox

The Video DownloadHelper (https://addons.mozilla.org/en-US/firefox/addon/3006) plugin allows the download of videos (including Flash videos) from sites like YouTube.

- You can add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> Video DownloadHelper. (This method will also ensure that automatic updates are installed by Firefox.)

Hide Tab Bar With One Tab plug-in

In Firefox v. 23 and later, the ability to hide tabs has been disabled. This plugin restores the ability to hide tabs if only one tab is open, restoring the function to hide tabs during normal browsing.

- You can add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> Hide Tab Bar With One Tab. (This method will also ensure that automatic updates are installed by Firefox.)

User Agent Switcher plug-in for Firefox

The User Agent Switcher (https://addons.mozilla.org/en-US/firefox/addon/user-agent-switcher/) plugin allows a browser to masquerade as another browser, allowing browser-specific content to be displayed (most of the time). In the past there were a few old web apps that ran only on IE (and if one is encountered this plug-in may still be useful). Now that Firefox is the world's leading web browser, however, this plug-in should no longer be necessary for the average user.

- A user agent string also identifies your OS. Users of an uncommonly used (and easily identifiable) OS may wish to protect their privacy and not identify their OS correctly; for these users, User Agent Switcher is valuable for privacy reasons. Some users, for example, may wish to identify their very specialised OS as Debian or Red Hat instead.
- You can add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> User Agent Switcher. (This method will also ensure that automatic updates are installed by Firefox.)
- To use this add-on, the settings for Firefox must be changed prior to usage:

  Firefox -> about:config -> Search: *useragent* -> general.useragent.enable_overrides -> *Toggle* (so that the value is *true*) -> Restart Firefox

Lightbeam (website crosslink visualization)

Lightbeam (https://addons.mozilla.org/en-US/firefox/addon/lightbeam/) is a Firefox plug-in that is able to display the links on a website (to which you are connected) while browsing, giving you an indication of who can see your browsing habits at that moment.

- You can add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Search All Add-ons -> Lightbeam. (This method will also ensure that automatic updates are installed by Firefox.)

Unplug Download Management

The UnPlug (https://addons.mozilla.org/en-US/firefox/addon/2254) add-on lets you save video and audio which is embedded on a webpage.

- You can add this extension from Firefox -> Tools -> Add-ons -> Get Add-ons -> Browse All Add-ons. (This method will also ensure that automatic updates are installed by Firefox.)

Lucifox (eBook reader extension)

Lucifox (https://addons.mozilla.org/en-US/firefox/addon/lucifox/) (Lucidor for Firefox) enables e-books to be read and e-book catalogs to be browsed in a Firefox window.

- To install, go to the website and click "Download Now."

Java Runtime Environment (JRE) for Firefox plug-in

- The IcedTea Plugin allows browsers to execute Java applets. The default *icedtea-plugin* package points to the *icedtea-6-plugin* package. Install:

```
sudo apt-get install icedtea-plugin
```

- Alternatively, install the IcedTea Plugin for version 7:

```
sudo apt-get install icedtea-7-plugin
```

- This package may need to be installed to run Java in Firefox, even if the Java Runtime Environment (JRE) is installed using ubuntu-restricted-extras, when installing OpenOffice, or installing the Java enviroment manually.

```
sudo apt-get install default-jre icedtea-plugin
```

Note: You must accept the license to use this product.

Adobe Acrobat Reader for Firefox Plug-in

This plugin is allows you to view Adobe Acrobat (PDF) files within the Firefox browser.

- Read Add Extra Repositories and enable the Oneiric partner repository:

```
deb http://archive.canonical.com/ubuntu Oneiric partner
```

  then install Adobe Reader:

```
sudo apt-get install acroread
```

- Alternatively, this plugin is also available from the Medibuntu repository. Add the Medibuntu repository to your repository list:

```
deb http://packages.medibuntu.org/ Oneiric free non-free
```

  then install:

```
sudo apt-get install acroread mozilla-acroread acroread-plugins acroread-fonts
```

Adobe Flash Player for Firefox Plug-in

To install the official Adobe Flash plugin (Flash 10) for Firefox:

```
sudo apt-get install adobe-flashplugin
```

Gnash Plug-in (Open source Flash Player replacement)

Gnash (http://www.gnashdev.org/) is available in a 64-bit version as well as a 32-bit version. It is

the open source replacement for Adobe Flashplayer.

```
sudo apt-get install gnash
```

After installing, change your web browser's Preferences -> Applications so that SWF and SPL files use Gnash.

VLC plug-in for Firefox

This package allows the popular VLC player to play media within the Firefox browser.

```
sudo apt-get install mozilla-plugin-vlc
```

Gecko MediaPlayer Plug-in for Firefox

Gecko MediaPlayer (http://kdekorte.googlepages.com/gecko-mediaplayer) is a browser plugin for all Gecko-based browsers (Firefox, SeaMonkey, IceApe, Opera) that allows Mplayer to play multimedia within the browser. Install:

```
sudo apt-get install gecko-mediaplayer
```

An alternative is to use the mplayer plugin for Firefox. Install:

```
 sudo apt-get install mozilla-mplayer
```

Kaffeine Plug-in for Firefox

This package allows the Kaffeine media player (often used in KDE-based desktops) to play multimedia within the Firefox browser.

```
sudo apt-get install kaffeine-mozilla
```

Helix player plug-in for Firefox

This package installs the Helix player (https://helixcommunity.org/) (the open source player that plays Real Player content in Linux) as well as the plugin that plays RealMedia within the Firefox browser.

```
sudo apt-get install mozilla-helix-player
```

Moonlight plugin for Firefox

Moonlight (http://www.go-mono.com/moonlight/) is part of the Novell Mono project that is an open source implementation of Silverlight (the Microsoft multimedia presentation platform). It is based on FFMpeg. It is made to work best with the Firefox 3 web browser, as a plugin (but also

works with other mozilla browsers). Version 2.3 is available as a plugin for mozilla-based browsers:

```
sudo apt-get install moonlight-plugin-mozilla
```

The stable version 2.4 is available here (http://www.go-mono.com/moonlight/stable.aspx) . The Moonlight 3.99 plugin (compatible with most Silverlight 3/4 content) is here (http://www.go-mono.com/moonlight/prerelease.aspx) . All source versions are here (http://origin-download.mono-project.com/sources/moon/) .

- Netflix under Moonlight

  Netflix streaming requires both the capabilities of Silverlight 2.0 and Digital Rights Management modules. Although the current version of Moonlight 2.0 will run most Silverlight content (including Netflix content), Netflix has not yet released Digital Rights Management modules for Linux. Please contact Netflix (http://www.netflix.com/ContactUs) directly for further information or sign a petition (http://www.petitiononline.com/Linflix/) .
  - An HTML5 Netflix plugin (currently being developed by Google for the Chrome browser) may soon be available. Other alternatives are to run Netflix in Wine or to use the Netflix Android app in a virtual Android environment.

FireFTP for Firefox

FireFTP (http://fireftp.mozdev.org/) is a Firefox extension for FTP transfers.

Firefox Widgets

Turn off browser bar drop-down list in Firefox

This is the most frequently asked problem regarding Firefox. To turn off the location browser bar drop-down list (http://kb.mozillazine.org/Browser.urlbar.maxRichResults) (and therefore not show your browsing history):

Firefox -> about:config (in the location browser bar) -> browser.urlbar.maxRichResults -> *right-click* -> Modify -> set value to 0

Turn off SSL certificate name in address bar

In newer versions of firefox, the validity of the SSL certificate associated with a website is displayed as a color-coded background to the Favicon (the small icon displayed in the address bar). However, Firefox currently also displays the name of the site issuing the SSL certificate, which can be annoying, since for most sites this is a duplicate of the domain name (which then gets displayed twice in the address bar). To turn off this behavior:

Firefox -> about:config (in the location browser bar) -> browser.identity.ssl_domain_display -> *right-click* -> Modify -> set value to 0

View Firefox cache

In a new window/tab, enter *about:cache* in the Firefox address bar. You can view and save individual elements (from all open windows/tabs) in the cache from there.

IceWeasel

- Due to trademark restrictions of Mozilla products, the Debian project has created versions of the (otherwise free) software that has been stripped of the non-free trademarks. See here (https://en.wikipedia.org /wiki/Mozilla_Corporation_software_rebranded_by_the_Debian_project) and the Debian wiki (http://wiki.debian.org/Iceweasel) for more information. To install them, use a package manager to add the Debian repository for your country (http://www.debian.org/mirror/list) (e.g. deb http://ftp.*us*.debian.org/debian unstable main) temporarily while installing the software. Then install the software package using the package manager or from the command line:
  - IceWeasel replaces the Firefox web browser (sudo apt-get install -t *iceweasel*).
  - IceDove replaces the Thunderbird email, newsreader, and calendaring client (sudo apt-get install -t *icedove*).
  - IceOwl replaces the Sunbird standalone calendaring client (sudo apt-get install -t *iceowl*).
- After installation of the individual package, it is best to disable the Debian repository so it does not interfere with the (K)Ubuntu repositories.
- A user that is interested in the philosophy of free software that Iceweasel symbolises may wish to consider a full Debian OS (http://wiki.debian.org/) installation (of which (K)Ubuntu is a fork) instead of (K)Ubuntu.

GNUzilla IceCat

The GNU project also maintains a version of Mozilla Firefox that is free of trademarks and branding, called GNUZilla IceCat (http://www.gnu.org/software/gnuzilla/) . .deb packages for (K)Ubuntu can be downloaded and installed through the GNUzilla PPA repositories (https://launchpad.net/~gnuzilla-team/+archive/ppa) .

Opera

Opera (http://www.opera.com/) is a proprietary browser and internet suite (currently free on PCs) also used in some mobile devices and gaming consoles. It includes email, an address book, IRC chat, integrated BitTorrent, and webfeeds. A limited number of plugins are also available. Download (http://www.opera.com/browser/download/) from the website and follow the instructions or install from the Opera repository:

```
echo "deb http://deb.opera.com/opera/ stable non-free" | sudo tee /etc/apt/sources.list.d/opera.list
wget -O - http://deb.opera.com/archive.key | sudo apt-key add -
sudo apt-get install opera
```

Chromium

Chromium (http://www.chromium.org/) is the open source browser on which Google Chrome is based. It does not include the undesirable user tracking mechanisms of Google Chrome or the Google logos (and is therefore recommended by many users instead of Chrome).

```
sudo apt-get install chromium-browser
```

Google Chrome

Google Chrome (http://www.google.com/chrome) is Google's proprietary web browser. Based on the open-source Chromium browser, Google adds the Google name and logo, an auto-updater system called GoogleUpdate, RLZ (a user-tracking mechanism), and other Google add-ons. To use this instead of Chromium, download and install the .deb package here (http://www.google.com/chrome/eula.html) .

Download Managers

MultiGet

MultiGet (http://multiget.sourceforge.net/) is a GTK-based free-standing download manager utility.

```
sudo apt-get install multiget
```

Usenet Clients

- Here (http://www.freeusenetnews.com/) is a sample list of free Usenet servers.

Pan

Pan (http://pan.rebelbase.com/) is a Gnome-based Usenet (http://en.wikipedia.org/wiki/Usenet) reader and nzb (http://en.wikipedia.org/wiki/Nzb) binary downloader. Install:

```
sudo apt-get install pan
```

Kwooty

Kwooty (http://kwooty.sourceforge.net/) is a Usenet (http://en.wikipedia.org/wiki/Usenet) reader and nzb (http://en.wikipedia.org/wiki/Nzb) binary downloader for KDE4. Installation instructions from source or PPA repositories are at the website.

Email Clients

Evolution

Evolution (http://projects.gnome.org/evolution/) is the default Gnome-based email client in

Ubuntu. If not installed:

```
sudo apt-get install evolution
```

Evolution and PGP

Email messages can be encrypted in PGP and sent by email using Evolution. See this tutorial (http://support.real-time.com/linux/email/client/evolutionpgp.html) for an example how to configure it.

Thunderbird

Mozilla Thunderbird (http://www.mozilla.com/en-US/thunderbird/) is a licensed and trademarked free open-source email client that is compatible with Firefox. Install:

```
sudo apt-get install thunderbird
```

Lightning calendar extension

Lightning (http://www.mozilla.org/projects/calendar/lightning/) is the calendar extension for Thunderbird (with functionality similar to the stand-alone application Sunbird). Install:

```
sudo apt-get install xul-ext-lightning
```

Enigmail

Enigmail (https://addons.mozilla.org/en-US/thunderbird/addon/71) is an add-on to Thunderbird that allows you to easily encrypt your email using OpenPGP (http://en.wikipedia.org/wiki/Pretty_Good_Privacy) , which is included in the kernel by default. It also allows you to create and manage the encryption keys. Go the website and click "Download Now". (64-bit versions are found here (http://enigmail.mozdev.org/download/download-static.php.html) .) Install:

Thunderbird -> Tools -> Add-ons -> Install -> select downloaded file

or

```
sudo apt-get install enigmail
```

- Also see these tips for instructions on setting up e-mail with PGP encryption.

Miniminize to System Tray

MinimizeToTray revived (https://addons.mozilla.org/en-us/thunderbird/addon/minimizetotray-revived/) is a valuable plugin/add-on/extension, IMO. It allows Thunderbird to be minimized to the System Tray instead of to the Taskbar. This allows Thunderbird to run discreetly in the

background, checking for new mail and calendar events (e.g. through the Lightning extension). The same plugin/add-on/extension also is available for Firefox (https://addons.mozilla.org/en-US/firefox/addon/minimizetotray-revived/) . Install:

> Thunderbird -> Tools -> Add-ons -> Get Add-ons -> Browse all add-ons (takes you to an external webpage) -> search for add-ons: *MinimizeToTray revived* -> + Add to Thunderbird -> Install Now -> Restart Thunderbird

New Mail Icon for Thunderbird

New Mail Icon (https://addons.mozilla.org/en-US/thunderbird/search?q=new+mail+icon&cat=all) is an experimental tray add-on which notifies you of new mail. (Note: If you leave Thunderbird running minimized to the System Tray (with the MinimizeToTray add-on, for example), it has a built-in "new message" notifier already, so that this add-on would not be necessary in such a situation.) Download from the website. Install:

> Thunderbird -> Tools -> Add-ons -> Install -> select downloaded file

KMail

KMail (http://kontact.kde.org/kmail/) (Kontact Mail) is the default email client included with Kontact in KDE (Kubuntu). Kontact includes email, an address book, a calendar, reminders, pop-up notes, a link to the Akregator News/RSS reader, time-tracking, and more. Install:

```
sudo apt-get install kontact
```

Newsreaders

Akregator

Akregator (http://akregator.kde.org/) is the default news/RSS (http://en.wikipedia.org/wiki/RSS) reader included with Kubuntu (KDE). Usage instructions are found in the Handbook (http://akregator.kde.org/wiki/index.php/Handbook) . Install:

```
sudo apt-get install akregator
```

RSSOwl

RSSOwl (http://www.rssowl.org/) is a Java-based RSS (http://en.wikipedia.org/wiki/RSS) | RDF | Atom Newsfeed Reader.

Install java and in order to use the internal browser, install the packages xulrunner and firefox:

```
sudo apt-get install sun-java6-jre firefox xulrunner
```

Change to your "opt" directory:

```
cd /opt
```

Download the zip-archive into your opt directory:

```
sudo wget http://downloads.sourceforge.net/rssowl/rssowl-2.0.6.linux.zip
```

Extract the archive and remove the extracted file:

```
sudo unzip ./rssowl-2.0.6.linux.zip && sudo rm ./rssowl-2.0.6.linux.zip
```

Make a startscript:

```
sudo gedit /usr/bin/runRSSOwl.sh
```

add the following lines to your startscript file /usr/bin/runRSSOwl.sh and save it afterwards.

```
   #!/bin/bash
   cd /opt/rssowl
   ./RSSOwl
```

Make the startscript executable:

```
sudo chmod u+x /usr/bin/runRSSOwl.sh
```

To start RSSOwl:

```
runRSSOwl.sh
```

Instant Messengers

Empathy

Empathy (http://live.gnome.org/Empathy) is an open source IM application. It is the default in the Ubuntu (Gnome) desktop. You can access multiple services with it. If not already installed, you can install it:

```
sudo apt-get install empathy
```

Pidgin

Pidgin (http://www.pidgin.im/) is an open source IM application. It is the previous default in the Ubuntu (Gnome) desktop. You can access multiple services with it.

```
sudo apt-get install pidgin
```

Kopete

Kopete (http://kopete.kde.org/) is the default Instant Messenger application for Kubuntu. You can access multiple services with it. Install:

```
sudo apt-get install kopete
```

Kopete Styles

Additional styles for Kopete (http://www.kde-look.org/index.php?xcontentmode=24x26) are available from KDE-look. Install from:

Kopete -> Settings -> Configure -> Chat Window -> Style -> Get New...

GoogleTalk on Kopete

Kopete can be configured to work with GoogleTalk (http://www.google.com/talk/about.html) Instant Messaging (but not VOIP) using the Jabber protocol. See these GoogleTalk instructions (http://www.google.com/support/talk/bin/answer.py?answer=57557) .

Konversation (IRC client)

Konversation (http://konversation.kde.org/) is the default Kubuntu Internet Relay Chat (IRC) client. It functions similar to the venerable mIRC. "A little less action and a little more Konversation." -- *Elvis*. Install:

```
sudo apt-get install konversation
```

XChat (IRC client)

XChat (http://xchat.org/) is a cross-platform IRC client that allows DCC downloads and scripts. Install:

```
sudo apt-get install xchat
```

or a Gnome-integrated version:

```
sudo apt-get install xchat-gnome
```

aMSN

aMSN is an MSN Messenger utility that functions like the original client. It is alternative to Pidgin for MSN users. Install it:

```
sudo apt-get install amsn
```

To enable Drag-and-Drop capabilities to aMSN for easy file transfer see Ubuntu Geek (http://www.ubuntugeek.com/how-to-enable-drag-and-drop-capabilities-to-amsn.html) .

Emesene

Emesene (http://www.emesene.org/) is an MSN messenger client that uses a simplified interface similar to the original client. It is alternative to Pidgin for MSN users. Install it:

```
sudo apt-get install emesene
```

FTP Clients

You might wish to use a dedicated FTP (http://en.wikipedia.org/wiki/File_Transfer_Protocol) client instead of the one in your browser. Also see these FTP tips.

Filezilla

Filezilla (http://filezilla-project.org/) is the ubiquitous free open-source FTP client and server for all platforms.

```
sudo apt-get install filezilla
```

Filesharing / P2P

- Do not share copyrighted material or content that is otherwise illegal to share.
- In an era of increasing censorship, spying, and surveillance using Deep Packet Inspection (https://en.wikipedia.org/wiki/Deep_packet_inspection) , encryption has become an essential componenet of data transfer. Look for clients that allow data encyrption.
- It is possible to use PeerGuardian 2 (https://en.wikipedia.org/wiki/PeerGuardian) with several clients. This service attempts to monitor and filter IP addresses known for censorship, spying, or provision of false or malicious data to this type of Internet service. Look for clients that are able to use this service.

Azureus

Azureus (http://azureus.sourceforge.net/howto_linux.php) is a Java-based BitTorrent client.

```
sudo apt-get install azureus
```

QBitTorrent

QBitTorrent (http://qbittorrent.sourceforge.net/) is a PyQT-based BitTorrent Client that is based on the uTorrent model.

```
sudo apt-get install qBittorrent
```

Transmission (BitTorrent Client)

Transmission (http://www.transmissionbt.com/) is the GTK-based default BitTorrent client in Ubuntu (Gnome). KTorrent can be used in Kubuntu.

```
sudo apt-get install transmission
```

Deluge

Deluge (http://deluge-torrent.org/) is a GTK-based BitTorrent client, with plugins and a server package / daemon available. Install the client:

```
sudo apt-get install deluge-torrent
```

or the GTK-based interface:

```
sudo apt-get install deluge-gtk
```

- The server daemon and web interface (for server functions) can be installed:

```
sudo apt-get install deluged deluge-web
```

Bittornado (BitTorrent Client)

BitTornado (http://www.bittornado.com/) is a KDE-compatible BitTorrent client. Install:

```
sudo apt-get bittornado bittornado-gui
```

Torrentflux (P2P client and server)

TorrentFlux (http://sourceforge.net/projects/torrentflux/) is a PHP based BitTorrent controller that runs on a web server (using a MySQL database with the mysql-server package for server functions or the mysql-client for client functions) and uses a web interface that can be accessed remotely (e.g. http://*localhost*/torrentflux). This makes it ideal for seedbox purposes. It uses the BitTornado client for downloads. Install:

```
sudo apt-get install torrentflux
```

Apollon (P2P Filesharing)

Apollon (http://apollon.sourceforge.net/index.html) is an older (now relatively obsolete) BitTorrent client that uses the Gift (http://gift.sourceforge.net/) network (Gnutella, etc.). It uses plugins for compatibility with multiple networks. Obtain the packages from the Debian Etch archives for apollon (http://archive.debian.net/etch/apollon) and gift (http://archive.debian.net/etch/giftd) .

MLDonkey (P2P eMule/eDonkey2000)

MLDonkey is a P2P file sharing program (and network) that is able to use different network protocols. To install the MLDonkey core server, follow these instructions (https://help.ubuntu.com/community/MLDonkey) .

MLDonkey GUI frontends

- Install the Gnome GUI frontend for MLDonkey:

```
sudo apt-get install mldonkey-gui
```

- Another GUI is called Sancho (http://sancho.awardspace.com/) .
- KMLDonkey (http://extragear.kde.org/apps/kmldonkey/) is the KDE (Kubuntu) frontend for MLDonkey (http://mldonkey.sourceforge.net/Main_Page) .

```
sudo apt-get install kmldonkey
```

Opentracker (Torrent tracker)

Opentracker (http://erdgeist.org/arts/software/opentracker/) is the most widely used torrent tracker (http://en.wikipedia.org/wiki/BitTorrent_tracker) software. It can be used within a private organisation or as a public service to track freely-available torrents. Download (through CVS) and installation instructions are at the website.

Videoconferencing and VOIP

Videoconferencing and voice over Internet (VOIP (https://en.wikipedia.org/wiki/Comparison_of_VoIP_software)) applications are merging into integrated applications. Most of these applications now allow placing calls to non-Internet based telephones for a small fee.

Ekiga

Formerly known as Gnomemeeting, Ekiga (http://www.gnomemeeting.org/) is a SIP compliant fully functional open source integrated VOIP and videoconferencing program.

```
sudo apt-get install ekiga
```

Skype

Skype (http://www.skype.com/) is a proprietary integrated VOIP and video conferencing program similar to Ekiga. Also see instructions on how to record Skype conversations (https://help.ubuntu.com/community/SkypeRecordingHowto) .

- Install pre-requisites:

```
sudo apt-get install libqt4-dbus libqt4-network libqt4-xml
```

- To get the most recent version, download and install the 32-bit version:

```
wget -O skype-ubuntu-current_i386.deb http://www.skype.com/go/getskype-linux-beta-ubuntu-32
sudo dpkg -i skype-ubuntu-current_i386.deb
sudo rm skype-ubuntu-current_i386.deb
```

or

```
wget -O skype-ubuntu-current_i386.deb http://download.skype.com/linux/skype-ubuntu-precise_4.2.0.11-1_i386.deb
sudo dpkg -i skype-ubuntu-current_i386.deb
sudo rm skype-ubuntu-current_i386.deb
```

- In the past. some users have noted that they cannot get their microphone inputs to work with any version later than 2.1.0.47. They installed:

```
wget -O skype-ubuntu-current_i386.deb http://download.skype.com/linux/skype-debian_2.1.0.47-1_i386.deb
sudo dpkg -i skype-ubuntu-current_i386.deb
sudo rm skype-ubuntu-current_i386.deb
```

or

```
wget -O skype-ubuntu-current_amd64.deb http://download.skype.com/linux/skype-ubuntu-intrepid_2.1.0.47-1_amd64.deb
sudo dpkg -i skype-ubuntu-current_amd64.deb
sudo rm skype-ubuntu-current_amd64.deb
```

How to install Skype on a 64-bit system

The current version of Skype for 64-bit systems is a masqueraded 32-bit module. To use on a 64-bit system you might still need to install the needed packages:

```
sudo apt-get install ia32-libs lib32asound2 libqt4-core libqt4-gui
```

- Then download and install the current Skype .deb package from the Skype website:

```
wget -O skype_ubuntu-current_amd64.deb http://www.skype.com/go/getskype-linux-beta-ubuntu-64
sudo dpkg -i skype-ubuntu-current_amd64.deb
sudo rm skype-ubuntu-current_amd64.deb
```

- If the 64-bit version doesn't work for you, use the 32-bit version (or see above for the most recent version):

```
wget -O skype-ubuntu-current_i386.deb http://www.skype.com/go/getskype-linux-beta-ubuntu-32
sudo dpkg -i --force-architecture skype-ubuntu-current_i386.deb
sudo rm skype-ubuntu-current_i386.deb
```

Installing Skype repository

It is possible to install Skype by adding the repository and installing from there. This has an advantage of maintaining updates automatically.

- Install the respository security key. (This requires an open port 11371 in your firewall for the keyserver.)

```
sudo apt-key adv --keyserver pgp.mit.edu --recv-keys 0xd66b746e
```

- Add the Skype repository, update, and install Skype:

```
echo "deb http://download.skype.com/linux/repos/debian/ stable non-free" | sudo tee -a /etc/apt/sources.list > /dev
sudo apt-get update
sudo apt-get install skype
```

Wengophone

Wengophone (http://www.wengophone.com/index.php/mp_download_wp_lin) is an integrated VOIP and videoconferencing client available on many platforms. Wengophone was initially an open-source GPL-licensed package ('Wengophone Classic'). Both the Classic version (available as a .deb file) and the current proprietary binary version are available from the website. Wengophone Classic has now been rebranded as QuteCom (http://www.qutecom.org/) , however. To install the current version as an Ubuntu/Kubuntu package, see these instructions (https://edge.launchpad.net/~cavedon/+archive/ppa) .

- Download and install the older Wengophone Classic version (.deb package):

```
wget http://download.wengo.com/wengophone/rc/wengophone-0.958m-1.i386.deb
dpkg -i --force-architecture wengophone-0.958m-1.i386.deb
```

Gizmo5

Gizmo5 (http://www.gizmo5.com) is an Internet soft-phone application, similar to Skype, that uses the SIP protocol. Install (.deb package):

```
wget http://download.gizmo5.com/GizmoDownload/gizmo-project_3.1.0.79_libstdc++6_i386.deb
dpkg -i --force-architecture gizmo-project_3.1.0.79_libstdc++6_i386.deb
```

Asterisk VOIP PBX system

Asterisk (http://www.asterisk.org/) is an enterprise-grade, free open source PBX and telephony system for VOIP.

```
sudo apt-get install asterisk
```

Kiax

Kiax (http://www.kiax.org/) is an LGPL-licensed open source IAX (Inter-Asterisk eXchange) application. It is used for making VoIP calls from an Asterisk PBX. The current version must be installed from source files. See the website for download and installation instructions, or see this Ubuntu Launchpad site (https://launchpad.net/ubuntu/jaunty/+package/kiax) .

OpenSIPS / OpenSER (SIP server)

OpenSIPS (http://www.opensips.org/) is an open-source SIP (http://en.wikipedia.org/wiki/Session_Initiation_Protocol) server that allows connections to be made through the Internet for VoIP (http://en.wikipedia.org/wiki/Voice_over_Internet_Protocol) , IM (http://en.wikipedia.org/wiki/Instant_messaging) , and other communications protocols. While there are many public SIP servers, these are subject to spoofing (http://en.wikipedia.org/wiki/Spoofing_attack) and other "impersonation" problems. A company may wish to host its own SIP server to avoid the problems inherent in public services whose trustworthiness can not be determined. OpenSIPS is the successor to OpenSER (http://packages.ubuntu.com/karmic/openser) (which is the version in the repositories). Install OpenSER 1.3.2 from the repositories:

```
sudo apt-get install openser
```

Alternately, the newest version of OpenSIPS can be downloaded as a .deb package from the website and installed. Installation and usage instructions are on the website.

Telepathy

Telepathy (http://telepathy.freedesktop.org/wiki/) is a flexible, modular communications framework that enables real-time VOIP/chat communication via pluggable protocol backends (for protocols such as Jabber/XMPP/Google Talk/Jingle, link-local XMPP, SIP, MSN, Yahoo/AIM and IRC). Telepathy is a communications service that can be simultaneously accessed by many client applications (primarily Empathy), using QT4, Glib, and GtK libraries. Currently a version for the Gnome desktop (telepathy-gnome) is available. Install:

```
sudo apt-get install telepathy-gnome
```

Web meetings

Web meeting software allows video conferencing among many clients, with one server as host.

BigBlueButton

BigBlueButton (http://www.bigbluebutton.org/) is a free open source chat/video/audio and

desktop sharing platform similar to GoToMeeting, WebEx, DimDim and similar products. Developed by GoogleCode, it utilises all open-source modules. A Moodle plugin (http://www.dualcode.com/bigbluebutton/index.htm) is also available. See these installation instructions (http://code.google.com/p/bigbluebutton/wiki/InstallationUbuntu) and these additional detailed instructions.

WebHuddle

WebHuddle (https://www.webhuddle.com/) is a free, open source Java-based browser client (and server) for web meetings. To install the server, first install pre-requisites, including Java, JBOSS Application Server, and xvfb.

```
sudo apt-get sun-java6-jre jbossas4 xvfb
```

For more details on setting this up in (K)Ubuntu, see this.

TeamViewer

TeamViewer (http://www.teamviewer.com/) is a proprietary cross-platform package that enables up to 25 participants to share a desktop for online meetings and provides a mechanism for users to control a PC's desktop remotely. Presentations can be viewed through most Internet web browsers, as well. A free .deb package can be downloaded here (http://www.teamviewer.com /download/linux.aspx) .

Privacy

- An interesting perspective on Internet privacy techniques can be found here (http://farid.hajji.name/blog/2009/06/20/circumventing-internet-censorship/) .
- Message encryption does not protect email file attachments. It is important to encrypt files that are meant to be sent as attachments as well. Any file encrypter (used for encrypting files on disk) can be used (such as ccrypt, TrueCrypt, or EncFS), but a different encryption tool / password should be used for attachments than the one used for private encryption of important files on the hard drive.

Text obfuscation

Companies routinely monitor the email and IM of its workers, governments of countries (even those founded by intellectuals and "revolutionaries" like Thomas Jefferson (http://en.wikipedia.org/wiki/Thomas_Jefferson) , who advocated strong privacy rights) routinely spy on its own citizenry, and even ISPs monitor unencrypted internet traffic for their own entertainment (I have personally watched this happen). Due to the volume of email and texts over the internet, word recognition algorithms are generally required in order to accomplish meaningful data-mining of text messages.

For purposes that do not require encryption (but for which there is a desire to limit the text data-mining techniques commonly used today), a few methods are available (but not foolproof).

- One method of text obfuscation is to translate your article into another language (using Google Translate (https://translate.google.com) , for example, or Babelfish (now owned by Yahoo and without SSL encryption available), or Bing Translator (owned by Microsoft and without SSL encryption available) -- or even all three in series) and then to translate it back. This introduces random grammar, word choice, and spelling errors that obscures both the writing style of the original author and sometimes the text to the point of poor recognition by text-mining scanners. The more languages into which the message is serially translated, the greater the unrecognizability.
- Anonymouth (https://github.com/psal/anonymouth) is a Java-based project for anonymizing writing styles (in English). Also see here (https://psal.cs.drexel.edu/index.php/JStylo-Anonymouth) .

FauxCrypt

FauxCrypt (http://fauxcrypt.org/) is a small program with an alhroitgm for modifictaion of a planitext documnet (written in **English**) taht laeves it gneerally raedable by a person but not raedily saercehd or idnexed by macihne. the alhroitgm empyols a dicitnoary subtsituiton of selected wrods, and an obfusctanig trnasposition of lteters in ohter wrods. the obfusctaion is dseigned to laeve the wrods udnertsnadable, aghtuolh tehy are badly slelpde. fauxcrypt is fere, open suorce sfotwaer, with suorce code available. Downloads are available at the website.

- Download the Linux binary:

```
wget http://fauxcrypt.org/fauxcrypt
```

- To convert a text file to a faux-encrypted text file:

```
fauxcrypt <input.txt> <output.txt>
```

Message and file encryption

PGP (Message Encryption)

PGP (http://en.wikipedia.org/wiki/Pretty_Good_Privacy) (OpenPGP and GnuPG (http://en.wikipedia.org/wiki/GNU_Privacy_Guard)) is a tool to encrypt your messages (such as email) to be unlocked only by someone who has a key to unlock it.

Enigmail with Thunderbird

By far the easiest method for encrypting email is using the Enigmail add-on for the Thunderbird email client. It creates PGP key pairs, stores and retrieves keys from keyrings, and encrypts and decrypts messages automatically.

Seahorse

Seahorse (http://projects.gnome.org/seahorse/) is the GUI for Gnome to manage the key pairs and

other options of GnuPG (http://www.gnupg.org/) . It can also manage your SSH keys. For more info see this tutorial (http://ubuntu-tutorials.com/2007/08/14/privacy-and-encryption-with-pgp-signing-and-encrypting-email-files/) . Run:

Menu -> Applications -> Accessories --> Passwords and Encryption Keys

scrypt (Message Encryption)

scrypt (http://www.tarsnap.com/scrypt.html) encrypts / decrypts messages with a strong algorithm. Using a 10-character password combining random alphanumeric and special characters, an enormous amount of computing power is required to decode messages by someone that does not have the password. See the website for usage parameters. Install:

```
sudo apt-get install scrypt
```

bcrypt (Message Encryption)

bcrypt (http://bcrypt.sourceforge.net/) encrypts / decrypts messages with a strong blowfish (http://en.wikipedia.org/wiki/Blowfish_%28cipher%29) algorithm. It is also able to overwrite the original message with a garbage-appearing replacement, further obscuring traces of the original message. See the website for usage instructions. Install:

```
sudo apt-get install bcrypt
```

File archival and encryption

Archives with Passwords

- See this section.

EncFS (File and Disk encryption)

EncFS (http://www.arg0.net/encfs) is a free, open-source tool to encrypt files and store them in a secondary directory. See the Wikipedia article (http://en.wikipedia.org/wiki/EncFS) . Additional installation steps can be found on Ubuntu Forums (http://www.ubuntuforums.org /showthread.php?t=148600) . Install:

```
sudo apt-get install encfs libpam-encfs
```

- A Gnome-based front-end named Cryptkeeper (http://tom.noflag.org.uk/cryptkeeper.html) is available:

```
sudo apt-get install cryptkeeper
```

ccrypt (File and Attachment Encryption)

ccrypt (http://sourceforge.net/projects/ccrypt/) is a command-line utility to encrypt files using the AES (http://en.wikipedia.org/wiki/Advanced_Encryption_Standard) encryption algorithm with a password. Install:

```
sudo apt-get install ccrypt
```

- Encrypt a file:

```
ccrpyt test.odt
```

  which will yield the encrypted file *test.odt.cpt* after prompting for a password

- Decrypt a file:

```
ccrypt -d test.odt.cpt
```

- Several available GUIs for ccrypt are listed here (http://ccrypt.sourceforge.net/#other) .

TrueCrypt (File and Attachment Encryption)

TrueCrypt (http://www.truecrypt.org/) is a free, open-source application that allows encryption of files using a 256-bit AES (http://en.wikipedia.org/wiki/Advanced_Encryption_Standard) encryption algorithm with a password. Download and Linux installation instructions are here (http://www.truecrypt.org/downloads) .

Disk and Storage Encryption

- See the Ubuntu Community documentation (http://help.ubuntu.com/community/FullDiskEncryptionHowto) for methods of full disk encryption.
- See the Ubuntu Community documentation (http://help.ubuntu.com/community/EncryptedFilesystems) for methods of filesystem encryption.

Passwords and file authentication

- See this excellent article at H-Online about password protection for everyone (http://www.h-online.com/security/features/Password-protection-for-everyone-1795647.html) .

Random password generator

- Pwgen is a command line utility to generate a block of random 8-digit alphanumeric passwords. Run it from Konsole (in Kubuntu) or Terminal (in Ubuntu). Install:

```
sudo apt-get install pwgen
```

- Run pwgen:

```
pwgen
```

- UUIDgen is a default utility to generate a random UUID (using only hex-digits (http://en.wikipedia.org/wiki/Hexadecimal)). Run:

```
uuidgen
```

The random UUID can also be used as a 32-digit password, if desired.

Password checker and enforcement

John the Ripper (http://www.openwall.com/john/) is a free open source password cracker that uses a dictionary of over 4 million commonly used passwords in many languages. Because this tool is widely available, it is useful for scanning and securing your own LAN and computers for password strength. Install:

```
sudo apt-get install john
```

- Passwdqc (http://www.openwall.com/passwdqc/) is a module to enforce password strength. Install:

```
sudo apt-get install passwdqc
```

MD5Sum

To check the MD5 sum of a file, use this command in the command line:

```
md5sum filename
```

Web browsing

Web tracking, scripts, and advertisements are extremely intrusive on the Internet. A dossier of your online habits is created by a multitude of services, including every major portal such as Google and Yahoo, as well as a variety of tracking services on the Internet. This is accomplished through the use of the "cookies (http://en.wikipedia.org/wiki/HTTP_cookie) " in your browser and by a variety of web elements (sometimes called "web beacons (http://en.wikipedia.org /wiki/Web_bug) ") embedded on the web pages you visit. Your behavior is monitored and correlated by recording the IP address of your computer (even when you turn off the cookies in your browser). It is highly recommended to configure your web browser to erase your cookies (http://support.mozilla.org/en-US/kb/cookies-information-websites-store-on-your-computer) and history every time the web browser is closed; otherwise, every website you subsequently visit can instantly see the long list of recent websites you have visited. In Firefox, for example, cookies can be accepted for the current session but erased upon closing:

Firefox -> Edit -> Preferences -> Privacy -> History -> Firefox will: *Use custom settings for history*
-> *Always use private browsing mode* (or customise the settings to your desired level of privacy)

- In addition, both Adblock Plus and NoScript are highly recommended as plug-ins for Firefox (and other Gecko-based browsers) to limit exposure to undesirable web elements, scripts, and tracking mechanisms.

DNS Servers and Search engines

- Most users rely on the DNS (http://en.wikipedia.org/wiki/Domain_Name_System) server of their ISP (Internet Service Provider). DNS queries can be recorded, however, and theoretically correlated by an ISP to the data traffic to/from a user's IP address serviced by that ISP. A somewhat less trackable solution is to use a DNS service that does not belong to your ISP. This can belong to another commercial ISP or to a third party service such as OpenDNS (http://www.opendns.com/) , Comodo (http://www.comodo.com/secure-dns/) , Google (http://code.google.com/speed/public-dns/) (though slightly less secure due to Google's own tracking mechanisms), another free DNS service (http://pcsupport.about.com/od/tipstricks/a/free-public-dns-servers.htm) , or (for maximum security) a publicly-available international DNS server (http://portforward.com/networking/dns.htm) . For example, a Verizon customer could use the AT&T DNS servers (http://www.whatsmydns.net/dns/usa/att.html) or the OpenDNS servers. An AT&T customer could use one of the Verizon servers (http://www.dslreports.com/faq/1591) or the Comodo servers. It is important to use a reliable DNS provider, however, as man-in-the-middle DNS redirection (http://en.wikipedia.org/wiki/Man-in-the-middle_attack) and DNS cache poisoning (http://en.wikipedia.org/wiki/DNS_cache_poisoning) attacks are increasingly common. Stick to one of the major DNS services (just not your own ISP's DNS service). It is important to note that starting Feburary 25, 2013, 5 major ISPs (Internet Service Providers) in the US (Comcast, Verizon, AT&T, Time Warner Cable, and Cablevision) have agreed to IP address recording and reporting (to the CCI (https://en.wikipedia.org/wiki/Center_for_Copyright_Information)) on behalf of the MPAA (https://en.wikipedia.org/wiki/Motion_Picture_Association_of_America) and RIAA (https://en.wikipedia.org/wiki/Recording_Industry_Association_of_America) . If using one of these ISPs, take extra efforts to ensure your privacy. (It is also important to note that major ISPs now often censor content using filters such as Cleanfeed (http://en.wikipedia.org/wiki/Cleanfeed_%28content_blocking_system%29) . Choose your DNS and search providers carefully.)

The DNS server setting can be changed in the router's settings (recommended) or individually for each computer. If changing on an individual computer, use the Network Manager or Wicd settings, or if using a static IP address with manually configured settings, add a line to /etc/network/interfaces with a list of the desired dns-nameservers at the end of the iface stanza so that the file resembles:

```
auto eth0
iface eth0 inet static
address 192.168.0.35
```

```
netmask 255.255.255.0
network 192.168.0.0
broadcast 192.168.0.255
gateway 192.168.0.1
dns-nameservers 8.26.56.26 208.67.222.222 8.20.247.20 208.67.220.220 8.8.8.8 8.8.4.4
```

- Many search engines track your search requests (notably Google, Bing, and Yahoo) and keep logs of the searches they receive from your IP address. DuckDuckGo.com (https://duckduckgo.com) is a filtered search engine that has made its reputation not only by promising not to track searches, but also by providing a secure (encrypted), Tor-capable and anonymized search portal. Point your browser to https://duckduckgo.com. It can be used with Tor turned on. Another search engine with similar privacy claims is Startpage (https://startpage.com/) / Ixquick (https://ixquick.com/) .
- Many censorship/filtering/tracking techniques (that use deep packet inspection (https://secure.wikimedia.org/wikipedia/en/wiki/Deep_packet_inspection)) cannot be used with secure (SSL/TLS (https://secure.wikimedia.org/wikipedia/en/wiki /Transport_Layer_Security) encrypted) websites (denoted by *https:// (https://secure.wikimedia.org/wikipedia/en/wiki/HTTP_Secure)*). Use them whenever possible. For example, use the secure Wikimedia portal (https://secure.wikimedia.org/) for Wikipedia (and other Wikimedia services) instead of the insecure portal(s).
- Many websites keep logs of referring http headers (which can be correlated with cookies to track your browsing activities). To turn off the passage of referral headers in Firefox, see this info (http://cafe.elharo.com/privacy/privacy-tip-3-block-referer-headers-in-firefox/) .

Changing a MAC address

The MAC address (https://en.wikipedia.org/wiki/MAC_address) of your network interface card is the "fingerprint" of your network connection. It is not possible to hide the MAC address and many tracking methods now use the MAC address to record user habits. (See this informative blog post (https://tails.boum.org/doc/first_steps/startup_options/mac_spoofing/) .) To combat this, it is possible to change ("spoof (https://en.wikipedia.org/wiki/MAC_spoofing) ") your apparent MAC address using software. It is important to remember, however, that it is generally the MAC address of the router (not computers on a LAN) which is displayed to the Internet. If you change the MAC of your computer but not the MAC of your router, you will gain nothing. Be sure to change both frequently (but most importantly that of the router).

- It is possible to set the MAC address to a random selection in the Network Manager configuration:

  Network Manager -> Manage Connections... -> *connection* -> Edit... -> Ethernet -> Cloned MAC Address -> Random -> Ok

- Macchanger (https://github.com/alobbs/macchanger) is a utility to change a MAC address. Install:

```
sudo apt-get install macchanger
```

Certificate verification

- Certificate authorities (http://en.wikipedia.org/wiki/Certificate_authority) charge a fee to store and verify certificates (http://en.wikipedia.org/wiki/Public_key_certificate) . However, many websites use self-signed certificates (http://en.wikipedia.org/wiki/Self-signed_certificate) that are not registered with any certifying authority. A free system of certificate "network notaries" has emerged called Perspectives (http://perspectives-project.org/) . A certificate's validity (even if self-signed) can be checked using a Firefox plugin (https://addons.mozilla.org/en-US/firefox/addon/perspectives/) . For more info see this introduction (http://www.techrepublic.com/blog/data-center/ssl-tls-certificates-perspectives-helps-authentication/) or this article (http://www.dedoimedo.com/computers/firefox-perspectives.html) .
- CAcert.org (https://secure.wikimedia.org/wikipedia/en/wiki/CAcert.org) is a free certifying authority that maintains weak certificates that are recognized by many open source operating systems, but not by Firefox or most browsers. (For browsers that do not include CAcert.org recognition, certificates appear to be self-signed certificates.) While Debian incorporates CACert.org's root certificate by default, Ubuntu derivatives do not (Canonical (https://secure.wikimedia.org/wikipedia/en/wiki/Canonical_Ltd.) was originally founded with funds earned from Thawte (https://secure.wikimedia.org/wikipedia/en/wiki/Thawte) , a certifying authority founded by Mark Shuttleworth (https://secure.wikimedia.org/wikipedia/en/wiki/Mark_Shuttleworth) .)

Tor (Network Privacy)

Tor (https://www.torproject.org/) is a project to allow privacy while using the Internet and to limit usage tracking. It routes your traffic through several anonymous nodes, so that your usage appears to come from an IP other than your own. (There are always risks when using the Internet that even Tor can not help with, though. Read this (https://www.torproject.org/download.html.en#Warning) .) Using Tor can slow down your Internet usage significantly, depending on how much traffic is being passed through the Tor network (routine file-sharing or large downloads will also significantly reduce performance of the Tor network.)

- Install Tor by following the instructions here (https://www.torproject.org/docs/debian) . Note that the instructions require port 11371 on your firewall to be open to use the gpg keyserver (and download the key for the debian package). Then see the Tor installation guide (https://www.torproject.org/docs/tor-doc-unix.html) for details.
- By default Tor (once it is running) acts as a Socks5 proxy (https://en.wikipedia.org/wiki/SOCKS) on port 9050. To send traffic from any application through Tor, configure the settings of that application to use a socks5 proxy on port 9050.
- Also see these additional tips.

Vidalia (Tor interface)

Vidalia (https://www.torproject.org/projects/vidalia.html) is the recommended Qt4-based GUI frontend for Tor. If not installed with Tor, install:

```
sudo apt-get install vidalia
```

Using Tor with Firefox and Thunderbird

Recent versions of Firefox and Thunderbird allow direct use of Tor as a Socks5 proxy (https://en.wikipedia.org/wiki/SOCKS) , both for traffic and DNS resolution. See this section for information on configuring this for Firefox and this section for information on configuring this for Thunderbird.

Using Tor with other programs

- Other programs can also be used with Tor as a proxy. For an overview see these tips.
  - Konversation, an Internet Relay Chat client
  - Filezilla, an FTP client
  - Both the Internet Messaging clients Kopete and Pidgin can be used with Tor (using the Off-the-Record (https://en.wikipedia.org/wiki/Off-the-Record_Messaging) messaging system through plugins).

Tails

- Tails (https://tails.boum.org/) is a free, complete GNOME-based Debian (http://www.debian.org/) Linux operating system with Tor enabled by default. Iceweasel (the free Debian version of Firefox) and other Internet tools are cryptographically-enhanced, and, for privacy, browsing and other Internet usage traces are minimised. Components include LUKS (https://en.wikipedia.org/wiki/LUKS) for disk-encryption, Nautilus Wipe (http://wipetools.tuxfamily.org/nautilus-wipe.html) for erasing disk traces using the Nautilus file manager, KeePassX (https://www.keepassx.org/) for password generation and encyrypted password storage, the Firefox plug-in HTTPS Everywhere (https://www.eff.org/https-everywhere) to ensure the usage of encrypted website portals, and Off-the-Record_Messaging (https://en.wikipedia.org/wiki/Off-the-Record_Messaging) for Internet Message encryption, among others (https://tails.boum.org /doc/encryption_and_privacy/index.en.html) .

Proprietary Extras

Proprietary software helps you maximize your Internet experience, but is not open source. The software available includes Multimedia Codecs, Java Runtime Environment, and plug-ins for Firefox.

Restricted Extras

The Ubuntu Restricted Extras will install Adobe Flash Player, Java Runtime Environment (JRE) (sun-java-jre) with Firefox plug-ins (icedtea), a set of Microsoft Fonts (msttcorefonts), multimedia codecs (w32codecs or w64codecs), mp3-compatible encoding (lame), FFMpeg, extra Gstreamer codecs, the package for DVD decoding (libdvdread4, but see here for info on libdvdcss2), the

unrar archiver, odbc, and cabextract. It also installs multiple "stripped" codecs and avutils (libavcodec-unstripped-52 and libavutil-unstripped-49). This is a single command approach.

```
sudo apt-get install ubuntu-restricted-extras
```

Note: Installation only works completely and properly when done from the command-line Terminal. The entire package will not usually install completely from within a Package Manager.

Java environment

- See this section for information on installing Java or the Java Runtime Environment.

Playing DVDs

- See this section for information on packages needed to play DVDs.

Photos and Graphics

Manage and edit your photos, create stunning 3D drawings and graphics, or convert between formats.

GIMP (Image Manipulator)

Gimp (http://www.gimp.org/) is a powerful, full-featured, free open-source graphics and image editor, similar to Adobe Photoshop.

```
sudo apt-get install gimp
```

- There is an extra set of brushes, palettes, and gradients for The GIMP.

```
sudo apt-get install gimp-data-extras
```

- See these instructions to create an alpha transparency layer (transparent background) for any image using Gimp.

Dia (Diagram editor)

Dia (http://live.gnome.org/Dia) is a free open source GTK-based diagram creation program for Gnome. It is similar to Visio.

```
sudo apt-get install dia
```

Kivio (Diagram editor)

Kivio (http://www.koffice.org/kivio/) is an open source flow-chart and diagram creation program

that is part of the KOffice Suite for KDE. It supports Dia stencils.

```
sudo apt-get install kivio
```

Inkscape (Vector Illustrator)

Inkscape Vector Illustrator (http://www.inkscape.org/) is an open source drawing program similar to Illustrator and CorelDraw.

```
sudo apt-get install inkscape
```

Digikam (Photo Organiser)

Digikam (http://www.digikam.org) is a comprehensive open source digital photo organiser and editor. Install it:

```
sudo apt-get install digikam kipi-plugins digikam-doc
```

F-spot (Photo Organiser)

F-spot (http://http://f-spot.org/) is a comprehensive open source digital photo organiser and editor for the Gnome desktop. Install it:

```
sudo apt-get install f-spot
```

Google Picasa (Photo Organiser)

Google Picasa (http://picasa.google.com/linux/) is a photo editor and organiser similar to Digikam. It allows uploads to a Google web server for online exchange. For more info, see the Picasa for Linux FAQ (http://picasa.google.com/linux/faq.html) . A self-installing .deb file is available at Picasa 2.7 downloads (http://picasa.google.com/linux/download.html#picasa27) .

Shotwell (Photo Organiser)

Shotwell (http://www.yorba.org/shotwell/) is a new photo organiser for the Gnome desktop. See these installation instructions (http://www.yorba.org/shotwell/install/) .

Tesseract (Optical Character Reader)

Tesseract (http://code.google.com/p/tesseract-ocr/) is a command-line optical character reader. Install:

```
sudo apt-get install tesseract-ocr
```

Ocropus (http://code.google.com/p/ocropus/) is a document-analysis engine that uses Tesseract.

Install:

```
sudo apt-get install ocropus
```

Cuneiform (Optical Character Reader)

Cuneiform (http://en.wikipedia.org/wiki/CuneiForm_(software)) is an optical character reader. Install (multiverse repositories must be enabled):

```
sudo apt-get install cuneiform
```

- Pdfocr (https://launchpad.net/~gezakovacs/+archive/pdfocr) is a tool to use Cuneiform for OCR and then to add the resulting text file layer back to the PDF file to make it searchable.

YAGF (Cuneiform/Tesseract GUI)

YAGF (http://www.symmetrica.net/cuneiform-linux/yagf-en.html) is a Qt-based GUI for Cuneiform, Tesseract, and/or XSane. Installation can be from a Debian (.deb) package from GetDeb (http://www.getdeb.net/software/YAGF) (see these instructions (http://www.getdeb.net/updates/ubuntu/11.04/) as well) or by compiling from source downloaded from the original site (http://symmetrica.net/cuneiform-linux/yagf-en.html) . (Qt 4.7 or later, already the version with Precise, is required on your system).

Xsane (Scanning utility)

Xsane (http://www.xsane.org/) is a full-featured scanning utility. Install:

```
sudo apt-get install xsane
```

Troubleshooting

Some users report a "SANE: Error during device I/O" error with HP multifunction printers. See this bug report (https://answers.launchpad.net/hplip/+question/18354) . If experiencing this problem, verify it in the logs:

```
sudo nano /var/log/User.log
```

If the logs include a line that references the file "libhpmud.so", such as in this example:

```
scanimage: scan/sane/soapht.c 67: unable to load restricted library: libhpmud.so: cannot open shared object file: N
```

then try creating the following symlink to fix the issue:

```
sudo ln -s /usr/lib/libhpmud.so.0 /usr/lib/libhpmud.so
```

Gnome-Scan (Scanning Utility)

Gnome-Scan (http://projects.gnome.org/gnome-scan/) is a simple utility for scanning (still in alpha stage). Install:

```
sudo apt-get install gnomescan
```

Gwenview (Image Manipulator)

Gwenview (http://gwenview.sourceforge.net/) is the quick image manipulator installed by default in Kubuntu (K menu -> Graphics -> Gwenview Image Viewer). Simple cut-and-paste, resizing, and format conversion are some of the graphics files manipulations that can be accomplished. Install:

```
sudo apt-get install gwenview
```

OpenClipart (ClipArt Library)

OpenClipart (http://www.openclipart.org/) is a utility to provide access to a large library of free PNG, SVG, and OpenOffice clipart. It includes a utility for OpenOffice Gallery. Files are installed to /usr/share/clipart. Install:

```
sudo apt-get install openclipart
```

It is also possible to only install a single collection (*openclipart-png*, *openclipart-svg*, or *openclipart-openoffice.org*) in case you don't want the entire collection (or the utilities). For example:

```
sudo apt-get install openclipart-png
```

Screencasts and Desktop Recording

Several utilities allow you to capture your desktop (and then create a screencast from it).

FFMPEG with x11grab

FFMPEG includes x11grab, a module for screen capture. This method gives the best results for screencaptures and is one of the most flexible methods, allowing a variety of audio inputs and audiovisual output formats. FFMPEG must be installed first (sudo apt-get install ffmpeg). See here for more details. In brief, an example command to capture to an .avi file using the X264 video codec and lossless 16-bit sound would be:

```
ffmpeg -f alsa -ac 2 -ab 192k -i pulse -f x11grab -s 1024x768 -r 30 -i :0.0 -acodec pcm_s16le -vcodec libx264 -vpre
```

recordMyDesktop (Desktop Session Recording)

recordMyDesktop (http://recordmydesktop.sourceforge.net/about.php) is a desktop recording utility, which has both pyGTK and a pyQT4 GUI frontends available. Recordings are saved in Theora video/Vorbis audio files. Only the Gtk version is available from the repositories (but it works well with KDE/Kubuntu nevertheless). To install with the gtk GUI:

```
sudo apt-get install gtk-recordmydesktop
```

Using recordMyDesktop with PulseAudio

- If you have not installed Pulse Audio Controls and Volume utility, they are useful for monitoring your pulse audio devices:

```
sudo apt-get install pavucontrol paprefs padevchooser
```

- Change the recordMyDesktop settings so that the capture device is the one you select through pulse audio:

  gtk-recordMyDesktop -> Sound Quality (ticked) -> Advanced -> Sound -> Device: pulse

This sets recordMyDesktop to use whichever input device(s) are selected through pulse audio. If you have several input devices, all of them will be recorded. This is an easy way to mix inputs.

Istanbul (Desktop Session Recording)

Istanbul (http://live.gnome.org/Istanbul) is a desktop recorder for the Gnome desktop. It records your session into an OGG Theora video file.

```
sudo apt-get install istanbul
```

xvidcap (Desktop Session Recording)

xvidcap (http://xvidcap.sourceforge.net/) is a utility to capture your desktop as a video. Install:

```
sudo apt-get install xvidcap
```

CamStudio

CamStudio (http://camstudio.org/) creates a virtual webcam that can mix several video sources together and can be used for live broadcasting. See the website for installation instructions.

Wink (Presentation Editor)

Wink (http://www.debugmode.com/wink/) is a open source tutorial and presentation editor. It allows you to capture screenshots and use them for presentations. Download the .tar.gz source package, install using these instructions (http://www.bitsbythepound.com/installing-wink-on-64-bit-ubuntu-210.html) , and follow one of the user guides (https://sites.google.com/a/debugmode.com/groups/wink/guides-and-tips-on-using-wink) .

```
wget -O winkcurrent.tar.gz http://www.digital2b.com/mirror_wink/wink15.tar.gz
```

Note: Wink is a 32-bit application. If you are running a 64-bit system, make sure ia32-libs is installed first:

```
sudo apt-get install ia32-libs
```

Freeseer (Presentation capture)

Freeseer (http://wiki.github.com/fosslc/freeseer/) is a utility to capture output from a projector or other display device (including another computer). See these installation instructions (http://github.com/fosslc/freeseer) .

Screencast Demos

- See this Screencast section.

Online content capture and streaming

- See this section for packages to capture or stream content online (over the Internet).

Video Disk Recording (Personal Video Recorder)

- See this section for information on disk recording from TV cards.

Video Applications

Capture, record, edit, and convert video using these applications.

- Also see the list of Media Players.
- Also see the Audio/Video Conversion section as well as these tips for video conversion techniques.
- Also see this section for information on packages needed to play DVDs.
- Also see this list (http://openvideoalliance.org/wiki/index.php?title=List_of_Open_Source_Video_Software) of open source video applications.
- Trivia: The movie Avatar (http://en.wikipedia.org/wiki/Avatar_%282009_film%29) was created at Weta Digital on a super-computer comprised of 4,000 servers running Kubuntu Linux, co-ordinated by the previously open-source Sun Grid Engine (no longer available).

OpenShot

OpenShot (http://www.openshotvideo.com/) is a GTK-based non-linear video editing suite for Linux. Install:

```
sudo apt-get install openshot
```

PiTiVi (Non-linear Video Editing Suite)

PiTiVi (http://www.pitivi.org/) is a simple, limited-capability open source video editor that will be the default in newer versions of Ubuntu. It uses the GStreamer/Fluendo framework. Install:

```
sudo apt-get install pitivi
```

Avidemux (Video editor/processor)

Avidemux (http://fixounet.free.fr/avidemux/) is a free, GPL-licensed open source cross-platform video editor and processor. Using mencoder as a backend, it allows cropping, trimming, special effects, and conversions between many filetypes (MPG/DVD, AVI, MP4, ASF). Install the GTK-based version:

```
sudo apt-get install avidemux
```

Kino (Non-linear Video Editing Suite)

Kino (http://www.kinodv.org/) is a widely used GUI-based non-linear video editing suite for Linux. It imports video files into (and then uses) the DV (http://en.wikipedia.org/wiki/DV) (Digital Video) format for editing.

```
sudo apt-get install kino mjpegtools
```

KdenLive (Non-linear Video Editing Suite for KDE)

Kdenlive (http://www.kdenlive.org/) is a GUI-based non-linear video editing suite for KDE based on FFmpeg and the MLT video framework. It has tools for DV, video4linux, and screen capture. Install:

```
sudo apt-get install kdenlive mjpegtools
```

Cinelerra (Non-linear Video Editing Suite)

Cinelerra Community Version (http://cinelerra.org/) is a complete high-end open source video editing suite that is a derivative of a similar commercial system. Follow the installation instructions for Ubuntu (http://cinelerra.org/getting_cinelerra.php#ubuntu) .

LiVES (Video editor/processor)

LiVES (http://lives.sourceforge.net/) is a free, GPL-license open source video editor and processor that is promoted as being useful for VJ editors. Install:

```
sudo apt-get install lives
```

OpenMovieEditor

OpenMovieEditor (http://www.openmovieeditor.org/) is a free, open source movie editing program for basic movie making. Install:

```
sudo apt-get install openmovieeditor
```

Blender

Blender (http://www.blender.org/) is a free GPL-licensed 3D graphics and modeling tool that has been used in several animation projects. Install:

```
sudo apt-get install blender
```

Stopmotion (Animation)

Stopmotion (http://stopmotion.bjoernen.com/) is an open-source program for creating stopmotion animation. Install:

```
sudo apt-get install stopmotion
```

Animata (Animation)

Animata (http://animata.kibu.hu/) is an interactive-animation (similar to Flash video) design platform that uses the fltk (http://www.fltk.org/) libraries. It is built from source using the SCons package (which is a *make* replacement).

- Make sure you have the usual components for compiling from source code installed:

```
sudo apt-get install ia32-libs build-essential linux-headers-$(uname -r) gcc cmake gettext
```

- Install the fltk and scons libraries:

```
sudo apt-get install libfltk1.1 libfltk1.1-dev scons
```

- See these details (http://animata.kibu.hu/doxygen/) . Download (http://animata.googlecode.com/files/animata_004-091218.tar.gz) the Animata source code, extract, and then from the directory into which Animata was extracted run scons:

```
scons
```

Webcam Applications

- To display your webcam on your screen, take photos from it, or to create other effects, install one of these webcam applications:
  - Cheese (http://projects.gnome.org/cheese/) (sudo apt-get install cheese) is a Gnome-based webcam application with many options and a re-sizable window.
  - Kamoso (http://kde-apps.org/content/show.php/Kamoso?content=111750) (sudo apt-get install kamoso) is a KDE-based webcam application.
  - Camorama (http://camorama.fixedgear.org/index.php) (sudo apt-get install camorama) is a Gtk-based webcam application that has been around for years.
  - Xawtv (http://git.linuxtv.org/xawtv4.git) (sudo apt-get install xawtv) is a Gtk-based application. Because the Xawtv window can be arranged so that only the webcam image is shown, it is my favorite webcam display for screencasts. (Click on "X" in the window bar -> Advanced -> No Border (*ticked*) .)

Any of these applications can be used in either Ubuntu or Kubuntu.

Video Disk Recording (VDR)

- MythTV has one of the leading capabilities for video disk recording.
- XBMC has an integrated frontend using the vdr backend.

Alternatives:

- VDR (http://www.linuxtv.org/vdrwiki/index.php/Main_Page) is a long-standing video disk recording app (backend) for Linux. Also see these instructions (http://www.linuxtv.org/vdrwiki/index.php/UBUNTU/Installation) (mostly in German) for (K)Ubuntu. Install:

```
sudo apt-get install vdr vdr-dev
```

- TVHeadend (https://www.lonelycoder.com/redmine/projects/tvheadend) has both a backend and frontend available for video disk recording. See the website for details.

Audio Applications

- Also see Media Players.

Audacity (Audio Editor and Recorder)

Audacity (http://audacity.sourceforge.net/) is the leading cross-platform free open source (GPL-licensed) audio recorder and editor. It can be used to record, splice, edit, and manipulate sound files similar to tools found in recording studios. Install:

```
sudo apt-get install audacity
```

Ardour (Digital Audio Workstation)

Ardour (http://ardour.org/) is a free, GTK-based professional-grade digital audio workstation for high end audio manipulation and mixing. Install:

```
sudo apt-get install ardour
```

Rosegarden (Digital Audio Workstation)

Rosegarden (http://www.rosegardenmusic.com/) is a midi/audio interface for synthesizers, as well as a digital audio studio for recording, editing, and notating music. It is often used in combination with Audacity. Install:

```
sudo apt-get install rosegarden
```

Hydrogen (Drum synthesizer)

Hydrogen (http://www.hydrogen-music.org/) is an advanced drum machine for Linux. Install:

```
sudo apt-get install hydrogen
```

EasyTag (ID3 editor)

EasyTag (http://easytag.sourceforge.net/) is a utility for editing the ID3 tags of mp3 and other music files. Install:

```
sudo apt-get install easytag
```

- Run:

  Applications -> Sound & Video -> EasyTAG

- Rename files using Artist and Track title:

  EasyTAG -> Scanner -> Rename File(s) and Directory...

Use *%a - %t* in the popup "Tag and Filename Scan" box to rename the files using the *Artist - TrackTitle* naming convention. Then click on the green scanner box in the popup ("Open scanner window / Scan selected files") to build a database of the changes (or EasyTAG -> File -> Scan File(s)). To save the changes (and actually rename the files), "Save Files" using the FloppyDisc icon in the top toolbar (or EasyTAG -> File -> Save File(s)).

This can be done in batch mode by highlighting numerous files in the "File Name" pane.

PuddleTag (ID3 editor)

PuddleTag (http://puddletag.sourceforge.net/) is a comprehensive utility for editing the ID3 tags of mp3 and other music files. Install:

```
sudo apt-get install python-qt4 python-pyparsing python-mutagen python-configobj python-musicbrainz2
wget -O puddletag_current.deb http://sourceforge.net/projects/puddletag/files/puddletag_0.9.12-1_all.deb
sudo dpkg -i puddletag_current.deb
```

UbuntuStudio (Ubuntu distribution customized for multimedia editing)

UbuntuStudio (http://ubuntustudio.org/) is an official derivative of Ubuntu that pre-packages many multimedia editing packages. (Each of the packages can also be installed independently.) See the website for a full list of the premier audiovisual software packages available for Ubuntu Linux.

- Install all the audio applications (https://wiki.ubuntu.com/UbuntuStudio/PackageList) found in UbuntuStudio:

```
sudo apt-get install ubuntustudio-audio
```

- Install all the video applications (https://wiki.ubuntu.com/UbuntuStudio/PackageList) found in UbuntuStudio:

```
sudo apt-get install ubuntustudio-video
```

- Install all the graphics applications (https://wiki.ubuntu.com/UbuntuStudio/PackageList) found in UbuntuStudio:

```
sudo apt-get install ubuntustudio-graphics
```

Audio / Video conversion

Here (http://maketecheasier.com/the-ultimate-guide-to-manage-your-audiovideo-files-in-linux/2009/03/03) is a nice review of some of the applications that enables conversion and handling of these types of files. Some specific examples and suggestions are here.

Mencoder

Mencoder (http://www.mplayerhq.hu/DOCS/HTML/en/mencoder.html) is part of the MPlayer (http://www.mplayerhq.hu/DOCS/HTML/en/index.html) set of libraries (that also uses several of the FFMPEG libraries) for audio/visual conversion, including from DVD (.vob) format to other video formats. Some examples of usage are here.

- There are many front-ends (http://www.mplayerhq.hu/design7/projects.html#mencoder_frontends) for mencoder, including k9copy.

FFMPEG video / audio conversion

FFMPEG (http://ffmpeg.org/) is the swiss-army knife of video and audio format conversion. It succeeds when no other program can. It is free and open source. If it not yet installed on your system as part of another package (it is used by many video/audio editors), then install it:

```
sudo apt-get install ffmpeg
```

- To convert many different formats, read the FFMPEG documentation (http://ffmpeg.mplayerhq.hu/ffmpeg-doc.html) . Also see this tutorial (http://howto-pages.org/ffmpeg/) .

For examples and further information, see this section.

- FFMpeg requires that multiple restricted extra codecs be installed. This can be done in a single easy step from the command-line Terminal:

```
sudo apt-get install ubuntu-restricted-extras
```

FFMPEG GUI

WinFF (http://winff.org) is a free, GPL-licensed open source GUI frontend for FFMPEG. Install:

```
sudo apt-get install winff xterm
```

Run:

Menu -> Applications -> Sound & Video -> WinFF

Join video segments

Individual video segments (MPEG-2, for example) can easily be joined:

```
cat samplevideo1.mpg samplevideo2.mpg samplevideo3.mpg > samplevideo123.mpg
```

You can then write the resulting MPEG-2 file to a DVD and play it in most DVD players.

Split a file into segments

Any file can be split (http://en.wikipedia.org/wiki/Split_%28Unix%29) into segments using the Linux command:

```
split -b 1440k my_big_file
```

which will split *my_big_file* into equal segments of size 1440 kb.

Save any streaming Flash video

An easy way is to install the Video Download Helper plug-in for Firefox.

Otherwise, most Flash videos download to the /tmp directory while you watch the video, creating a randomly-named video file there (such as Flashuh4G6s). When you close the webpage, this file in the /tmp directory will be erased. After the entire video has downloaded, but before you close the webpage, copy that file (such as Flashuh4G6s) to your home directory (where it will not be erased). Of course, for this to work, you must change your Flash (or Gnash) settings to allow an unlimited buffer. While watching your Flash video, *right click* to bring up the Flash -> Settings window. Set the Buffer to "Unlimited."

Once you have copied the file, rename it appropriately with the .flv added to the filename. You can then watch it using VLC or Mplayer.

Here (http://ihatehate.wordpress.com/2009/03/30/how-to-download-save-streaming-video-from-the-internet-using-linux/) is another method that involves making a symbolic link.

Save rtmp / flv streams

flvstreamer (http://savannah.nongnu.org/projects/flvstreamer) is a command-line application to dump rtmp streams. Install:

```
sudo apt-get install flvstreamer
```

Example (http://www.uluga.ubuntuforums.org/showthread.php?t=1390764) of usage:

```
flvstreamer -r "rtmp://host/dir/file.flv" -o filename.flv
```

If you see the following the "WARNING: Download may be incomplete, try --resume!" message, try to use the --resume option:

```
flvstreamer -r "rtmp://host/dir/file.flv" -o filename.flv --resume
```

Convert Flash video audio to mp3

Once you have downloaded flash video content (.flv) from the Internet (using the Video Download Helper plug-in for Firefox, for example), the audio component can be converted to an .mp3 file. (This will work for any type of video file, not just Flash.) For details, see this section.

2ManDVD

2ManDVD (http://2mandvd.tuxfamily.org/) is a GUI utility for creating DVD videos. It is the successor of ManDVD. Choose the version for your architecture and install it from the 2ManDVD website (http://www.getdeb.net/app/2ManDVD) . Click on the download link and select to open it with the GDebi Package Installer (default). (If you have previously installed ManDVD you must uninstall it first.) For a usage tutorial, read this 2ManDVD guide (http://www.my-guides.net/en/content/view/170/26/) .

Run:

Menu -> Applications -> Sound & Video -> 2ManDVD

DeVeDe

DeVeDe (http://www.rastersoft.com/programas/devede.html) is a program to create video DVDs and CDs suitable for home players (i.e. VCD, sVCD or CVD) from any source video file that is supported by MPlayer. Choose the version for your architecture and install it from the DeVeDe website (http://www.getdeb.net/app/DeVeDe) . Click on the download link and select to open it with the GDebi Package Installer (default). For a usage tutorial, read this DeVeDe guide (http://www.my-guides.net/en/content/view/75/26/) .

Run:

Menu -> Applications -> Sound & Video -> DeVeDe

ManDVD

ManDVD (http://www.kde-apps.org/content/show.php/ManDVD?content=83906) is a QT-based DVD authoring tool which accepts several different file types as input. Install:

```
sudo apt-get install mandvd xine-ui
```

DVD Author

- For more details on creating a "commercial" (.vob (http://en.wikipedia.org/wiki/VOB)) format DVD-video, see this section.
- DVD author (http://dvdauthor.sourceforge.net/) allows you to create menus and format your MPEG-2 videos onto a DVD disc so that you can play it in a commercial DVD player. DVD Author is a command line tool, but several GUI's exist. Install:

```
sudo apt-get install dvdauthor
```

- To prepare an audiovideo file (e.g. an .avi file) for conversion to DVD (.vob) format authoring (using a tool like dvdauthor), it is best to convert the file to a format with MPEG-2 (avcodec) video, AC3 (lav) audio, and the MPEG-PS (A+V) container as an intermediate first. This can be done using the GUI utility Avidemux, for example. Here (http://avidemux.org/admWiki/doku.php?id=tutorial:converting_to_dvd) is the Avidemux tutorial for doing this. Details are also found here.

QDVDAuthor

- QDVDAuthor (http://qdvdauthor.sourceforge.net/) is a Qt-based GUI for DVD Author. A package for Precise does not exist, but the Maverick package can be used.
- Enable the Maverick multiverse repository temporarily by adding it to the Synaptic

Package Manager Origin of Packages ("Other" software):

Menu -> System -> Synaptic -> Settings -> Edit Origins -> Software Sources: Other Software -> Add...

```
deb http://us.archive.ubuntu.com/ubuntu maverick multiverse
```

- From the Get and Remove Software menu (of Synaptic), install the *qdvdauthor* package (and the *qdvdauthor-common* package if it is not automatically installed as a dependency).
- Once the download/installation is complete, disable the Maverick multiverse repository (to prevent conflict with other Precise packages).
- Download and install the addons:

```
cd /tmp
wget http://qdvdauthor.sourceforge.net/data/masks.tar.bz2 -O masks.tar.bz2
wget http://qdvdauthor.sourceforge.net/data/buttons.tar.bz2 -O buttons.tar.bz2
wget http://qdvdauthor.sourceforge.net/data/alpha_trans.tar.bz2 -O alpha_trans.tar.bz2
cd /usr/share/qdvdauthor/
sudo tar -xjf /tmp/masks.tar.bz2
sudo tar -xjf /tmp/buttons.tar.bz2
sudo tar -xjf /tmp/alpha_trans.tar.bz2
```

Run:

Menu -> Multimedia -> QDVDAuthor

Follow instructions in the Quick-Start Guide:

QDVDAuthor -> Help -> Quick-Start Guide

For a tutorial on authoring DVDs, see this guide (http://womble.decadent.org.uk/talks/dvd-ukuug06/dvd-talk-ukuug06-paper.html) .

Other DVD authoring programs

There are several other DVD authoring programs. For additional information see the Ubuntu Community (https://help.ubuntu.com/community/DVDAuthoring) pages. Packages include:

Bombono (http://www.bombono.org) , a GTK-based, GUI DVD authoring program. Install (requires multiverse repositories to be enabled):

```
sudo apt-get install bombono-dvd
```

- DVDStyler (http://dvdstyler.org) is a full-featured, cross-platform DVD-authoring frontend. Install:

```
sudo apt-get install dvdstyler
```

KMediaFactory (http://code.google.com/p/kmediafactory/) is a fast and simple KDE-based DVD authoring frontend for dvdauthor. (The DVD folders can then be burned to disc using K3b.) Install (requires multiverse repositories to be enabled):

```
sudo apt-get install kmediafactory
```

ToVid

ToVid (http://tovid.wikia.com/wiki/Tovid_Wiki) is a collection of tools to create a DVD from a number of different video formats. A GUI is available. Install:

```
sudo apt-get install tovidgui tovid
```

Ripper X CD Ripper/Encoder

Ripper X (http://sourceforge.net/projects/ripperx/) is a GTK-based (i.e. Gnome) open source utility to rip CD audio tracks to OGG, MP3, or FLAC formats. It supports CDDB lookups.

```
sudo apt-get install ripperx
```

Asunder CD Ripper/Encoder

Asunder (http://littlesvr.ca/asunder/) is a GTK-based open source CD ripper/encoder which saves to Wav, MP3, OGG, FLAC, or WavPack. Self-installing .deb packages are available here (http://www.getdeb.net/app.php?name=Asunder) .

Audex CD Ripper/Encoder

Audex (http://www.kde-apps.org/content/show.php/Audex?content=77125) is a port to KDE4 of the KAudioCreator package used in KDE 3. It can create output for LAME (MP3-compliant), OGG Vorbis (oggenc), FLAC and RIFF WAVE. Install:

```
sudo apt-get install audex
```

Gnac (GNome Audio Converter)

Gnac (GNome Audio Converter) (http://gnac.sourceforge.net/) converts between all GStreamer supported audio formats. It is not yet part of the standard repositories. See these installation instructions (http://launchpad.net/~gnac-team/+archive/ppa) .

SOX (encodes/decodes audio)

SoX (http://sox.sourceforge.net/) is a command-line utility to convert audio formats. See this usage guide (http://sox.sourceforge.net/sox.html) . Install:

```
sudo apt-get install sox
```

Run:

```
sox
```

Install MP3 support for SoX

- See this blog post (http://eggblog.invertedegg.com/?p=19) or this Ubuntu Forums thread (http://ubuntuforums.org/showthread.php?t=17272) .
- Install the MP3 libraries (if not already installed):

```
sudo apt-get install libmp3lame0
```

- For simple conversions, I have found FFMPEG to be easier, and FFMPEG already has mp3 support. Example:

```
ffmpeg -i audiofile.m4a -ab 128k -ac 2 -ar 44100 audiofile.mp3
```

where -ab specifies the bit rate, -ac specifies the number of channels (in this example 2-channel stereo), and -ar specifies the sampling frequency.

CDs and DVDs

Brasero (CD/DVD burner)

Brasero (http://projects.gnome.org/brasero/) is a CD/DVD burning application that is now part of the Gnome desktop (but can be used with any Ubuntu derivative). If not already installed:

```
sudo apt-get install brasero
```

Gnomebaker (CD/DVD burner)

Gnomebaker (http://sourceforge.net/projects/gnomebaker) has been the default CD/DVD burning application for the Gnome desktop. If not installed:

```
sudo apt-get install gnomebaker
```

K3b (CD/DVD burner)

k3b (http://K3b.org) (KDE Burn Baby Burn) is the default KDE CD and DVD burning utility

included in Kubuntu, but can run well in Gnome. (Due to licensing requirements, mp3 capabilities must be installed separately as the libk3b6-extracodecs package). Install:

```
sudo apt-get install k3b libk3b6-extracodecs
```

Normalize audio levels

Volume normalization for an audio CD requires a separate external plugin. Install:

```
sudo apt-get install normalize-audio
```

Then select normalization:

K3b -> Project -> Properties -> Advanced -> Settings:Normalize volume levels (*ticked*)

- Recent versions of k3b have a bug that doesn't properly recognise normalize-audio. See these tips (http://machine-cycle.blogspot.com/2011/04/fixing-normalize-audio-feature-in-k3b.html) (or these tips (http://sites.google.com/site/tipsandtricksforubuntu/system-tips/k3b-and-normalize-audio)) for a workaround.

Cdrecord troubleshooting

Cdrecord error 254

Note: The solution here has not been verified, and the problem may lie in a different module than cdrkit, such as libdvdread. This section is under construction.

The problem usually occurs when a large amount of data (around 3.5 GB or larger) is being written to a DVD-R. The wodim 1.11 (there seem to be no problems with older versions of wodim such as v1.9) and genisoimage packages from the cdrkit (or one of their dependencies) used by Debian-based distributions (including (K)Ubuntu) may be dysfunctional and may generate a message similar to "cdrecord error 254" error while burning using K3B. Alternately, any file(s) written above the 3.5 GB limit may be improperly written to DVD.

- See this explanation (http://cdrecord.berlios.de/private/linux-dist.html) , and this Ubuntu forums thread (http://ubuntuforums.org/showthread.php?t=851707) and this one (http://ubuntuforums.org/showthread.php?t=852085) .
- This effectively limits DVD-R burning to less than 3.5 GB. One suggested solution entails installing a current copy of cdrtools (http://cdrecord.berlios.de/private/cdrecord.html) manually. One location for obtaining cdrtools .deb packages is this Launchpad PPA repository (http://launchpad.net/~brandonsnider/+archive/cdrtools) . Download and install the *cdrecord* .deb package for your OS type (i386 or amd64). mkisofs and cdda2wav should be installed as well, as indicated here (http://ubuntuforums.org/showthread.php?t=852085) .
- Solution: Do not use the cdrecord (which includes wodim) for writing DVD disks that contain more than 3.5 Gb data. Instead, use growisofs:

k3b -> Burn -> Writing app: *growisofs* -> Writing mode: *DAO*

this has successfully allowed me to burn DVDs with more than 3.5 Gb data.

- Alternatively, obtain and use the older version of k3b/cdrecord/wodim (v1.9), such as used in the Lucid Lynx. This is not an easy solution to implement other than by installing a standalone Lucid Lynx OS in its own small partition.

Cdrecord has no permission to open the device error

If you receive the "cdrecord has no permission to open the device" error while burning using K3B, open a terminal and type:

```
sudo chmod 777 /dev/scd0
```

Note: replace */dev/scd0* with your own device, e.g. */dev/sr0*.

Note: chmod 777 is the universal option for granting full permission to a folder. The 777 mask indicates that read, write, and execute permission is given to all users.

K9copy (DVD Ripper)

K9copy (http://en.wikipedia.org/wiki/K9copy) is the free open source DVD backup (http://en.wikipedia.org/wiki/DVD_ripper) , copying, compression, and authoring utility that requires libdvdcss. For other info, see this (http://www.dvd-guides.com/guides/linux/213-how-to-copy-dvd9-to-dvd5-using-k9copy) or this (http://www.my-guides.net/en/content/view/77/26/) guide. You can easily create MPEG-2. MPEG-4, or DVD videos with this utility.

```
sudo apt-get install k9copy
```

- See this section for tips on using k9copy with mencoder and NTFS DVDs.
- Tips: At times you may not be able to copy your DVD directly from DVD to DVD. This may because you have a small imperfection in the DVD, or because the DVD was initially created with a non-standard burning method. There are two methods that can help solve this problem:
  - Copy the VIDEO_TS and AUDIO_TS folders from your original DVD directly to your hard drive. Then use k9copy (or k3b or Gnomebaker) to burn a DVD directly from these hard drive folders.
  - Use k3b (or Gnomebaker) to copy an .iso image from the original DVD to your hard drive. Then use k9copy to extract from the hard drive .iso image and then burn a DVD directly from it.

Handbrake

Handbrake (http://handbrake.fr/) is a GPL-licensed open source tool for converting DVD to MPEG-4 (iPod format) that is an alternative to k9copy. (It can handle many DVDs that k9copy

cannot.) Note that Handbrake supports X264/H.264 and MP4 video encoding but no longer supports the XVID video codec. It uses the .MP4/.M4V or .MKV containers, but no longer supports the .AVI container. However, it uses a streaming algorithm that (while slower than other methods) is compatible with a large variety of encryption techniques. (Following "ripping" from a DVD, the resulting .MP4 or .MKV file can be converted to other formats, such as .AVI with XVID, using these suggestions.) Installation is from the developmental PPA archive (https://edge.launchpad.net/~stebbins/+archive/handbrake-releases) .

```
sudo add-apt-repository ppa:stebbins/handbrake-releases
sudo apt-get update
sudo apt-get install handbrake-gtk handbrake-cli
```

If you do not intend to use the command-line interface, you can skip handbrake-cli.

- Alternatively, to your package manager you can add the custom repository:

```
deb http://ppa.launchpad.net/stebbins/handbrake-releases/ubuntu oneiric main
```

then install the package *handbrake-gtk* (and *handbrake-cli* if desired).

dvd::rip

dvd::rip (http://www.exit1.org/dvdrip/) is a DVD backup (http://en.wikipedia.org/wiki/DVD_ripper) /copy program, written in GTK-based perl, that uses the transcode (http://www.transcoding.org/cgi-bin/transcode) and ffmpeg (http://www.ffmpeg.org/ffmpeg-doc.html) video/audio processing and conversion tools. See the website for installation and official documentation. For other info, see this dvd::rip tutorial (http://www.my-guides.net/en/content/view/136/26/) . Install:

```
sudo apt-get install dvdrip rar
```

Acidrip

Acidrip (http://sourceforge.net/projects/acidrip/) is a DVD backup (http://en.wikipedia.org/wiki/DVD_ripper) /copy program, written in GTK-based perl, that uses the Mplayer (http://www.mplayerhq.hu/design7/news.html) and Mencoder (http://www.mplayerhq.hu/DOCS/HTML/en/mencoder.html) video/audio processing and conversion tools (and therefore yields the best quality DVD rips to an .AVI file with XVID video, for example). See the website for installation and official documentation. Install:

```
sudo apt-get install acidrip
```

DVD Fab (DVD Ripper)

DVD Fab (http://www.dvdfab.com) is the favoured DVD backup tool for today's DVD encryption methods. It must be run in Wine (since it is a Windows application). It comes as a fully featured 30-day trial, but see these instructions (http://geek-out-blog.blogspot.com/2009/01/how-to-restart-

dvdfab-trial-period.html) for fine-tuning the trial period.

DVD Playback Capability

libdvdcss

To play encrypted DVDs, the libdvdcss2 package is essential. libdvdcss2 is a simple library designed for accessing DVDs like a block device without having to bother about the decryption. More information about this package can be found at VideoLAN (http://www.videolan.org/developers/libdvdcss.html) .

- Add the VideoLAN repository key:

```
wget -O - http://download.videolan.org/pub/debian/videolan-apt.asc|sudo apt-key add -
```

- Install the repository and package manually from the command-line:

```
sudo add-apt-repository "deb http://download.videolan.org/pub/debian/stable/ /"
sudo apt-get update
sudo apt-get install libdvdcss2
```

- Alternatively add the VideoLAN repository using your package manager:

```
deb http://download.videolan.org/pub/debian/stable/ /
```

  then install the *libdvdcss2* package using the package manager.

- You can install libdvdcss2 as a 64-bit .deb package (without installing VideoLAN repositories):

```
wget -c http://download.videolan.org/pub/debian/stable/libdvdcss2_1.2.13-0_amd64.deb
sudo dpkg -i libdvdcss2_1.2.13-0_amd64.deb
```

  or a 32-bit .deb package:

```
wget -c http://download.videolan.org/pub/debian/stable/libdvdcss2_1.2.13-0_i386.deb
sudo dpkg -i libdvdcss2_1.2.13-0_i386.deb
```

- As of September 2013, Medibuntu (http://www.medibuntu.org/) is no longer maintained. Here are legacy Medibuntu instructions which will work for only a limited period more.
  - You can install libdvdcss2 as a 64-bit .deb package (without installing Medibuntu repositories):

```
wget -c http://packages.medibuntu.org/pool/free/libd/libdvdcss/libdvdcss2_1.2.12-0.0medibuntu1_amd64.deb
sudo dpkg -i libdvdcss2_1.2.12-0.0medibuntu1_amd64.deb
```

or a 32-bit .deb package:

```
wget -c http://packages.medibuntu.org/pool/free/libd/libdvdcss/libdvdcss2_1.2.12-0.0medibuntu1_i386.deb
sudo dpkg -i libdvdcss2_1.2.12-0.0medibuntu1_i386.deb
```

- You can also install 32 bit or 64 bit Windows multimedia codecs (if you haven't already done so using ubuntu-restricted-extras):

```
sudo apt-get install w32codecs
```

or

```
sudo apt-get install w64codecs
```

libudf

Many newer DVDs use the UDF filesystem. To play them properly, also install libudf:

```
sudo apt-get install libudf0
```

Other tools are useful:

```
sudo apt-get install udftools libudf-dev
```

Music Players

Rhythmbox

Rhythmbox (http://en.wikipedia.org/wiki/Rhythmbox) is the default music player in Ubuntu (Gnome), relying on the Gstreamer framework.

Play Internet Radio through Rhythmbox

Internet radio can be played through Rhythmbox by installing the rhythmbox-radio-browser plugin:

```
sudo apt-get install rhythmbox-radio-browser
```

- Restart Rhythmbox and select the plugin:

  Rhythmbox -> Edit -> Plugins -> Internet radio station browser (*ticked*) -> Library -> Radio browser

Note: Internet radio streams use many different ports. You must adjust your firewall to allow the

ports over which the streams will be sent.

XMMS2

XMMS2 (http://xmms2.org) is a compact, fast GTK-based music player that is a fork of XMMS. It resembles WinAmp2 and can use the "Classic" WinAmp2 / XMMS skins. Volume normalization (using ReplayGain) is an option using a plug-in. It supports many other plugins and is ideal for streaming content. Install:

```
sudo apt-get install xmms2
```

Audacious

Audacious (http://en.wikipedia.org/wiki/Audacious_Media_Player) is a compact, fast GTK-based music player that is a fork of XMMS. It resembles XMMS2 (http://xmms2.org) and WinAmp2 and can use the "Classic" WinAmp2 / XMMS skins. Volume normalization (using ReplayGain) is a built-in option. It supports many plugins and is ideal for streaming content. Install:

```
sudo apt-get install audacious
```

You can switch between the "PulseAudio Output Plugin" and the "ALSA Output Plugin" under

Audacious -> Preferences -> Audio -> Current output plugin.

- There are many places to get .wsz skins ("Classic" Winamp2/XMMS) that are compatible with Audacious, XMMS2, or QMMP:
  - Winamp2 Classic skins (http://www.winamp.com/skins/search/classic/classic)
  - XMMS Themes from Gnome-look (http://gnome-look.org /index.php?xcontentmode=130)
  - 1001 Skins (http://www.1001skins.com/)

QMMP

- QMMP (http://qmmp.ylsoftware.com) is a compact, fast Qt-based music player similar to XMMS2 (http://xmms2.org) , Audacious (http://audacious-media-player.org/) , and WinAmp2 and can use the "Classic" WinAmp2 / XMMS skins. Volume normalization (using ReplayGain) is a built-in option. It supports many plugins and is ideal for streaming content. Install:

```
sudo apt-get install qmmp
```

You can switch between the "PulseAudio Output Plugin" and the "ALSA Output Plugin" under

QMMP -> Settings -> Audio -> Current output plugin.

Amarok

Amarok (http://amarok.kde.org/) is the default music player in Kubuntu. Install:

```
sudo apt-get install amarok
```

Amarok themes

Amarok themes (http://www.kde-look.org/index.php?xcontentmode=55) can be downloaded from KDE Look and installed.

- Download the theme (ending in .tar.bz2) to your home directory (or chosen directory).
- Amarok -> Settings -> Appearance -> Install New Style
- Select the downloaded file.

Play Shoutcast Internet Radio through Amarok

Shoutcast (http://classic.shoutcast.com) internet radio can be played through Amarok 2.2 or later by installing the Shoutcast script:

> Amarok -> Tools -> Script Manager -> Get more scripts -> Order by:Rating (*ticked*) -> Shoutcast service -> Install -> Restart Amarok -> Tools -> Script Manager -> Shoutcast service tralala (*ticked*) -> Ok -> Internet -> Shoutcast service tralala

Note: Internet radio streams use many different ports. You must adjust your firewall to allow the ports over which the streams will be sent.

Banshee Music Player

Banshee (http://banshee-project.org/) is a Gstreamer, Mono and Gtk-based music player for Linux and Mac OS X. It supports multiple mp3 players (including the iPod).There are plugins for podcasts, internet radio, and more.

```
sudo apt-get install banshee
```

Exaile Music Manager and Player

Exaile (http://www.exaile.org/) is a GTK-based music player that supports many formats, incorporates a Shoutcast directory, a plugin for iPod, Last.FM support, tabbed playlists, and other features. Install:

```
sudo apt-get install exaile
```

Songbird Music Player

Songbird (http://getsongbird.com/) is an open source music player from Mozilla with an appearance meant to resemble iTunes. It is in current development and does not yet have full

support for mp3 players (such as the iPod). It incorporates a Shoutcast internet radio interface. The current beta version can be downloaded from the website.

aTunes

aTunes (http://www.atunes.org/) is a Java-based player designed to be similar to iTunes. Installation instructions are here (http://www.atunes.org/wiki/index.php?title=Installing_aTunes_on_Linux_%28under_GNOME%29) .

Multimedia Players

Most current video multimedia players play many video formats (as well as audio), including the Flash video .flv format.

VLC Multimedia Player

VLC (http://www.videolan.org/) is a cross-platform multimedia player that supports many formats without need for additional codecs. It can not only receive video streams (http://wiki.videolan.org/Documentation:Streaming_HowTo/Receive_and_Save_a_Stream) (also see here (http://tom.zickel.org/vlcmp4/) to convert it to mp4), but can act as a server for video streams, as well. It is one of the only players that can view and backup almost any DVD format, no matter which copy protection is used. See these tips (http://www.freedvdripper.net/guides/rip-dvd-convert-video-with-free-vlc-player.html) for using VLC to backup/rip encrypted DVDs.

```
sudo apt-get install vlc vlc-plugin-pulse
```

- Troubleshooting tip: On some hardware (such as the Acer Aspire One), the video is blank or VLC freezes when trying to play a file or disc. To solve this problem, select "X11 video output":

  VLC -> Tools -> Preferences -> Video -> Output: *X11 video output (XCB)* -> Save

VLC plugins

There are many VLC plugins. You will likely only need to install a few of them, however, depending on your hardware and input/output configuration:

```
sudo apt-get install vlc-plugin-ggi vlc-plugin-jack vlc-plugin-pulse vlc-plugin-sdl vlc-plugin-svgalib mozilla-plug
```

MPlayer Multimedia Player

Mplayer (http://www.mplayerhq.hu/design7/info.html) (and now Mplayer2) is a video player with a wide range of formats supported (including RealMedia and Windows-codecs) and a wide variety of outputs.

```
sudo apt-get install mplayer
```

or

```
sudo apt-get install mplayer2
```

- There are several frontends for MPlayer. See this complete list (http://www.mplayerhq.hu/design7/projects.html) .
  - Kmplayer (http://kmplayer.kde.org/) (sudo apt-get install knmplayer) -- for KDE
  - KPlayer (http://kplayer.sourceforge.net/) (sudo apt-get install kplayer) -- for KDE
  - SMPlayer (http://smplayer.sourceforge.net/) (sudo apt-get install smplayer) -- Qt-based
  - Mplayer-gui (sudo apt-get install mplayer-gui) -- GTK-based

Dump a video stream to disc

You can dump a video stream to disc using Mplayer:

```
mplayer -dumpstream streamurl
```

If you don't know the exact URL of the stream you wish to save, you can discover it from the webpage it is embedded in by using the Firefox add-on UnPlug. Do not save streams that are illegal to download.

Xine-UI Multimedia Player

Xine UI (http://xinehq.de/) is a multimedia player based, of course, on the xine platform. It can also play streamed video from the Internet and supports most formats, including some uncommon ones.

```
sudo apt-get install xine-ui
```

Kaffeine Video Player

Kaffeine (http://kaffeine.kde.org/) is a video player for Kubuntu/KDE. Install:

```
sudo apt-get install kaffeine
```

RealPlayer 11 Multimedia Player

The Linux Realplayer is actually based on the open-source Helix player (https://player.helixcommunity.org/) . Helix itself can be installed as a package easily (read Helix plug-in) and used instead of Realplayer. These instructions are to install the proprietary version of RealPlayer only.

Download Real Player official linux player (http://www.real.com/linux)

Open a terminal and cd to the directory you have downloaded realplayer's .bin file. Then issue the following commands

```
chmod +x RealPlayer11GOLD.bin
sudo ./RealPlayer11GOLD.bin
```

When it asks for installation path enter /usr/local/RealPlayer

For all other questions just choose default by pressing enter.

If you have installed mozilla-mplayer package you will need to delete the mplayer firefox plugin for real player videos. Other wise all real player files will open with mplayer. For that please do this

```
cd /usr/lib/firefox/plugins
sudo rm mplayerplug-in-rm.*
```

Please remember to restart firefox and when ever you click on a real player video choose the option open with and use /usr/bin/realplay

Internet TV

Myth TV

See MythTV. Ubuntu TV is essentially Myth TV.

Miro Player

Miro Player (http://www.getmiro.com/) (formerly Democracy TV Player) is an open-source Internet TV and video player that allows you to watch Internet TV and videos. Unlike other video players, it contains a structured guide that includes more than 2500 channels, has built-in BitTorrent, and has features that can automatically save videos, such as from YouTube.

```
sudo apt-get install miro
```

Sopcast Internet TV

Sopcast (http://www.sopcast.org) is an interface to play live P2P video streams through the VLC media player. Install VLC first. This is a Chinese program and most content is hosted in China and may not be legal in your area. Please consult local regulations.

You can install a SopCast Player PPA (https://launchpad.net/~jason-scheunemann/+archive/ppa) using the following commands:

```
echo "deb http://ppa.launchpad.net/jason-scheunemann/ppa/ubuntu `lsb_release -cs` main" | sudo tee -a /etc/apt/sou
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys CD30EE56
```

If you are using Karmic or later:

```
sudo add-apt-repository ppa:jason-scheunemann/ppa
sudo apt-get update
sudo apt-get install sopcast-player
```

Run:

Applications->Sound & Video->SopCast Player

Zattoo

Zattoo (http://www.zattoo.com/) is a free Internet TV player that allows you to watch terrestrial television from various countries in Europe. See the Zattoo Download (http://zattoo.com/en/download/linux) page for further instructions on installation. For screenshots and an alternate installation guide, see this UbuntuGeek guide (http://www.ubuntugeek.com/watching-live-tv-on-your-ubuntu-desktop-with-zattoo.html) .

- Install dependencies first:

```
sudo apt-get install libgtkglext1 adobe-flashplugin
```

- Download the latest .deb package from Zattoo Download (http://zattoo.com/en/download/linux) page.

```
wget http://zattoo.com/release/download.php
```

- Install the downloaded .deb package:

```
sudo dpkg -i *.deb
```

- Run Zattoo:

  K -> Application -> Multimedia -> Zattoo Player

  Note: you have to register for a free account when the player starts.

TV Time (TV Viewer)

TVTime (http://tvtime.sourceforge.net/) allows the display of television and other digital inputs (made available to the computer by a video capture card (http://tvtime.sourceforge.net/cards.html)). A plugin for the Remuco remote control (http://code.google.com/p/remuco/) (remuco-tvtime) is also available. Install:

```
sudo apt-get install tvtime
```

ABC iView

Python-iView (https://launchpad.net/~jeremy-visser/+archive/python-iview) is a program that

works with rtmpdump to record streams offered by ABC iView (http://www.abc.net.au/tv/iview/) (Australia). Installation instructions are at the PPA repository (https://launchpad.net/~jeremy-visser/+archive/python-iview) .

BBC iPlayer

BBC iPlayer (http://www.bbc.co.uk/iplayer/) provides replays and downloads of BBC programs to UK residents. The BBC, however, has crippled its streams to prevent downloading and legal actions against iPlayer appear to be in progress. (Flvstreamer may be required for rtmp stream recording). To install a Flash 64-bit edition of iPlayer:

```
sudo apt-get remove flashplugin-installer
sudo add-apt-repository ppa:sevenmachines/flash
sudo apt-get update
sudo apt-get install flashplugin64-installer
```

get_iplayer (BBC program recording)

- get_iplayer (http://www.infradead.org/get_iplayer/html/get_iplayer.html) allows BBC streams (through their iplayer service) for UK users, as well as Hulu streams for US users, to be recorded to mp4, wav, and mp3 files (depending on content). See here (https://github.com/dinkypumpkin/get_iplayer/wiki) for usage instructions. Install (may not work for all users):

```
sudo apt-get install get-iplayer
```

- See the website for usage or:

```
man get-iplayer
```

- Get a current listing of what's available and save it in the home directory

```
get-iplayer >~/iplayer-listing.txt
```

- Having found some interesting programmes (and noted the numbers found in the left-hand column), download them:

```
get-iplayer --get 123 537
```

- For Live Streaming (with mplayer) use one of these commands (http://linuxcentre.net/getiplayer/documentation#Live%20Streaming) .
- iPlayer can be run in Wine using these instructions (http://bbciplayerlinux.sourceforge.net/index.php/Main_Page) .
- Some users will need to install rtmpdump for successful streaming.

Netflix in Wine app

A (Windows-based) Netflix app (32-bit version) has been modified and bundled to work in the Wine environment. It is available as a package from a private (non-approved) repository here (https://launchpad.net/~ehoover/+archive/compholio) .

- To run the app will require a 32-bit operating system, which for a 64-bit operating system usually requires installing ia32-libs at the minimum (and possibly ia32-libs-multiarch):

```
sudo apt-get install ia32-libs ia32-libs-multiarch
```

- Then install the Netflix-desktop:

```
sudo apt-add-repository ppa:ehoover/compholio
sudo apt-get update
sudo apt-get install netflix-desktop
```

- The package installs the Microsoft core fonts (ttf-mscorefonts-installer). During this part of the installation a prompt to accept the Microsoft EULA will appear. Use the "TAB" key to maneuver to the "Ok" button and then press "Enter" to accept. The installation should then continue to completion.
- The package creates a menu item for the Netflix Destop, or the app can be started from a terminal with the command:

```
netflix-desktop
```

- The Netflix app starts in full screen mode. You can exit out of the app completely by pressing ALT+F4 or by using the pop-up "X." You can also press F11 to exit out of full screen mode.
- Additional installation tips are here.

Netflix Android App

A Netflix app for the Android market is available here (https://market.android.com /details?id=com.netflix.mediaclient) . It must be installed in an Android environment but is not fully functional in the current Android emulators.

Internet Radio

Internet radio streams through different ports, so check your firewall if you are not able to play the streams.

Last FM

LastFM (http://www.last.fm/) is a service for sharing music recommendations and individual radio streams. It is included as an option in Amarok, or can be installed separately:

```
sudo apt-get install lastfm
```

Shoutcast Internet Radio

Shoutcast (http://www.shoutcast.com/) is the first and last free mp3 streaming service. Hundreds of radio streams can be played through Amarok, Audacious, or other multimedia player. Simply associate the .pls streams with your favourite player (Audacious or XMMS2 recommended).

StreamTuner Stream Directory Browser

StreamTuner (http://www.nongnu.org/streamtuner/) lists streams available on the Internet through a GTK-based interface. It lists Shoutcast and Live365 streams, among others. Install:

```
sudo apt-get install streamtuner
```

Streamripper

Streamripper (http://streamripper.sourceforge.net/) is a standalone command-line utility to record online audio streams (primarily from Shoutcast). Also see these tips. Install:

```
sudo apt-get install streamripper
```

- Fadecut (https://github.com/micressor/fadecut) is a front-end script that allows the removal of certain elements of live streams (sudo apt-get install fadecut)
- KStreamRipper (http://kde-apps.org/content/show.php?content=78068) /KRadioRipper is a GUI front-end for KDE (sudo apt-get install kradioripper)

RadioTray

RadioTray (http://radiotray.sourceforge.net/) is an app that, once started, docks in the System Tray and allows easy selection from a list of online .pls streams (listed by radio station genre). Additional .pls streams and genres can be easily added to the pre-configured list. Install:

```
sudo apt-get install radiotray
```

Pithos (Pandora client)

Pithos (http://kevinmehall.net/p/pithos/) is a Gnome-based Pandora (http://en.wikipedia.org/wiki/Pandora_Radio) internet radio client. Install:

```
sudo apt-get install pithos
```

Spotify

Spotify (http://en.wikipedia.org/wiki/Spotify) is a music streaming service that bases streams on user tastes and interests. Download the Spotify client .deb package for your system (i386 version for 32-bit systems or amd64 version for 64-bit systems) and either the Qt version or Gnome front-end from this location (http://repository.spotify.com/pool/non-free/s/spotify/) then click on the two packages to automatically install them. For example, to install the 64-bit version with the Qt front-end:

```
wget -O spotify-client_current.deb http://repository.spotify.com/pool/non-free/s/spotify/spotify-client_0.9.4.183.g
wget -O spotify-client-qt_current.deb http://repository.spotify.com/pool/non-free/s/spotify/spotify-client-qt_0.9.4
sudo dpkg -i spotify-client_current.deb
sudo dpkg -i spotify-client-qt_current.deb
sudo rm spotify-client_current.deb
sudo rm spotify-client-qt_current.deb
```

Alternatively, install the repository and install the packages from the repository.

- To use the keyserver, port 11371 in your firewall must be unblocked temporarily, then add the repository key manually (using the command-line terminal):

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys 94558F59
```

- Add the repository manually (using the command-line terminal):

```
sudo apt-add-repository "deb http://repository.spotify.com stable non-free"
sudo apt-get update
```

or add the repository *deb http://repository.spotify.com stable non-free* to your package manager through its settings dialog.

- Install either the regular 64-bit version or select the 32-bit (i386) version, either using your package manager or manually (using a command-line terminal):

```
sudo apt-get install spotify-client
```

- Install one of the GUI frontends (Qt for Ubuntu or Gnome for Ubuntu), either using your package manager or manually (using a command-line terminal):

```
sudo apt-get install spotify-client-qt
```

or

```
sudo apt-get install spotify-client-gnome-support
```

Media Centers and PVR (Personal Video Recorder)

There are a number of open-source Media Centers for Linux, some of which include personal video recorder functions. For a full list of open-source media centers, see this guide (http://www.telematicsfreedom.org/en/project/14/floss-media-center-state-art) .

MythTV

MythTV (http://www.mythtv.org/) is a media center with PVR (personal video recorder) for retrieving, recording, and playing broadcast and Internet TV and other multimedia content. It has many options and plugins for expansion. To be useful, you will need a compatible TV tuner card (http://www.mythtv.org/wiki/index.php/Tuner_Card) . For setup tips, see this guide (http://parker1.co.uk/mythtv_ubuntu.php) . (Ubuntu TV is essentially Myth TV that has been integrated into the Unity desktop). Install:

```
sudo apt-get install mythtv
```

Mythbuntu

Mythbuntu (http://www.mythbuntu.org) is an integrated Ubuntu (Xubuntu) desktop optimised for MythTV usage. In can be used instead of adding MythTV to a (K)Ubuntu desktop.

XBMC

XBMC (http://xbmc.org/) is a free, mature, open-source cross-platform media center. It does not have a PVR capability nor as many functions as MythTV, but has a very nice interface.

- Add these third party repositories:

```
deb http://ppa.launchpad.net/team-xbmc-intrepid/ubuntu intrepid main
deb-src http://ppa.launchpad.net/team-xbmc-intrepid/ubuntu intrepid main
```

- Install:

```
sudo apt-get update
sudo apt-get install xbmc
```

Boxee

Boxee (http://www.boxee.tv/) is an XBMC-like open source package to allow streaming video over the Internet, including from YouTube and other sites. It is a fork of XBMC, and is still in alpha development and testing stage. It is currently available for 32-bit systems only, and recommended for Hardy. A current version is anticipated soon. (Note: Boxee does not run Netflix on Linux, despite their ads). See these download instructions (http://app.boxee.tv /download) .

Elisa

Elisa (http://elisa.fluendo.com/) is a cross-platform media center that uses the Gstreamer multimedia framework. Commercial plugins are available from Fluendo. It supports PVR and Music Jukebox . Install:

```
sudo apt-get install elisa
```

LinuxMCE

See LinuxMCE.

Multimedia Servers

MPD Multimedia Playing Server

MPD (http://mpd.wikia.com/wiki/What_MPD_Is_and_Is_Not) is a music server meant for LAN usage. It can be controlled from remote clients. It can also stream internet streams.

TiMidity++ MIDI Sound Server

TiMidity (http://timidity.sourceforge.net/) is a MIDI software synthesizer required by several games and other MIDI-dependent applications.

```
sudo apt-get install timidity
```

uShare UPnP A/V Media Server

uShare (http://ushare.geexbox.org/) is a UPnP media server compatible with the Xbox360 and PS3.

```
sudo apt-get install ushare
```

Also see: How-to: Run uShare at Startup (http://ubuntuguide.org/index.php?title=How-to:_Getting_uShare_to_run_at_Startup) .

Content streaming

Icecast

Icecast2 (http://icecast.org/) is a multimedia streaming server that allows the creation of an "Internet radio station." Install:

```
sudo apt-get install icecast2
```

- There are several GUI-frontends for Icecast (http://www.icecast.org/3rdparty.php) (that allow live inputs to be streamed).
  - EZStream (http://ezstream.com/) (sudo apt-get install ezstream)
  - DarkIce (http://code.google.com/p/darkice/) (sudo apt-get install darkice)
  - Ices2 (http://www.icecast.org/docs/ices-2.0.0/) (sudo apt-get install ices2) is part of the Icecast2 project. It allows Ogg Vorbis streaming only.
  - Oggfwd (http://manpages.ubuntu.com/manpages/precise/man1/oggfwd.1.html) (sudo apt-get install oggfwd) is a barebones client to send Ogg Vorbis files to an Icecast

server.
- Djplay (http://djplay.sourceforge.net/) (sudo apt-get install djplay) is Qt-based, uses the Jack audio system, and supports live Icecast broadcasting.
- LiquidSoap (http://liquidsoap.fm/doc-svn/index.html) (sudo apt-get install liquidsoap liguidsoap) is an OCAML and Python-based scripting language and GTK-based GUI for building complex audio-streaming systems (with many plug-ins available) for use with an Icecast (or other streaming) server

CRTMPServer

CRTMPServer (http://rtmpd.com/) (aka Rtmpd) is a free (GPLv3-licensed) server that can stream Flash and many other media types using rtmp streaming. Install:

```
sudo apt-get install crtmpserver
```

Red5 Media Server

The Red5 Media Server (http://www.red5.org/) is a Java-based media streaming server and recorder that uses rtmp and AMF protocols to stream (and/or receive) flash video and other content. Install:

```
sudo apt-get install red5-server
```

FLVStreamer

Flvstreamer (http://savannah.nongnu.org/projects/flvstreamer) is an open source command-line RTMP client to stream audio or video content from all types of flash or rtmp servers. It is a fork from rtmpdump with encrypted rtmp and swf verification support removed. Install:

```
sudo apt-get install flvstreamer
```

rtmpdump (Capture streaming video)

Rtmpdump (http://rtmpdump.mplayerhq.hu/) allows the capture of many types of streaming video. Install:

```
sudo apt-get install rtmpdump
```

Streamcapture with VLC

VLC allows the capture of certain types of streaming content. See the VLC instructions (http://www.videolan.org/doc/streaming-howto/en/ch02.html) . You can also "Convert" streams to selected video file formats.

VLC -> Media -> Stream... -> Network -> Please enter a network URL:

- If you don't know the exact URL of the stream you wish to save, you can discover it from the webpage it is embedded in by using the Firefox add-on UnPlug. Do not save streams that are illegal to download.

Streamcapture with MPlayer

- See this section.

Home Automation / Home Theater / Home Security

Complete Systems

Linux MCE (Media Center Edition)

LinuxMCE (http://en.wikipedia.org/wiki/LinuxMCE) is an integrated home theater/home security/home automation/telephone PBX/intercom system for your home. It incorporates MythTV (http://en.wikipedia.org/wiki/MythTV) , Pluto (http://plutohome.com/) home automation, Motion (http://www.lavrsen.dk/twiki/bin/view/Motion/WebHome) security surveillance, Asterisk (http://www.asterisk.org/) PBX, VDR (http://www.cadsoft.de/vdr/) video disk recorder, and other home automation/security/theater packages in an integrated platform. It is available in 32 and 64 bit versions. LinuxMCE can run either as a standalone Home Theater PC or can co-ordinate a fully networked home, using the networking capabilities that are intrinsically part of the (K)Ubuntu Linux OS. For more info see the LinuxMCE website (http://www.linuxmce.org) or wiki (http://wiki.linuxmce.org/index.php/Main_Page) .

The most recent stable version runs on Kubuntu 8.04 (Hardy). A beta version for Kubuntu 10.04 (Lucid) has been released, and the full version is anticipated soon. LinuxMCE can be installed at the same time as the Kubuntu OS (on a new PC with an nVidia graphics card), with a single DVD installation. Alternatively, Kubuntu can be installed first and LinuxMCE then installed from a 2 CD installation.

Other systems in development

- MisterHouse (http://misterhouse.sourceforge.net/) -- a Perl-script based open source home automation project. See the example Ubuntu server installation walkthrough (http://misterhouse.wikispaces.com/MisterhouseOnUbuntu) .
- Minerva (http://www.minervahome.net/) -- home automation and multimedia control with a GUI interface. It can even hook into Google Calendar.
- DomotiGa (http://www.domotiga.nl/) -- home automation software from the Netherlands, using a MySQL database.
- NetHomeServer (http://wiki.nethome.nu/doku.php/start) is a Java-based cross-platform automation system authored by a single coder. It is in alpha development but can be downloaded from the website and evaluated.
- The Wosh (http://wosh.sourceforge.net/) framework is message-based middleware to effect home automation processes. The project is in early development.

- Linux Home Automation (http://www.linuxha.com/) contains information regarding many nascent home automation projects.

Home Security

Zoneminder surveillance system

Zoneminder (http://www.zoneminder.com/) manages surveillance cameras and stores images on the hard disk. Images can be viewed using a (LAMP) server remotely. X10 devices can be triggered using built-in perl scripts. Install:

```
sudo apt-get install zoneminder ffmpeg
```

Myth Zoneminder

MythZoneminder (http://www.mythtv.org/wiki/MythZoneMinder) allows you to view your security cameras through Myth TV, essentially. It is a plugin that interfaces the two packages Zoneminder (which must be working on your system) and Myth TV (which must also be working.) See the installation instructions (http://www.mythtv.org/wiki/MythZoneMinder#Install_MythZoneMinder) . Install:

```
sudo apt-get install mythzoneminder
```

Office Suites

LibreOffice

LibreOffice (http://www.libreoffice.org/default/) is a free and open source (GPL-licensed) office suite with applications for word processing (Writer (http://www.libreoffice.org/features/writer/)), math formulae and equations (Math (http://www.libreoffice.org/features/math/)), diagrams and charts (Draw (http://www.libreoffice.org/features/draw/)), presentations (Impress (http://www.libreoffice.org/features/impress/)), spreadsheets (Calc (http://www.libreoffice.org/features/calc/)), and databases (Base (http://www.libreoffice.org/features/base/)) that is now installed by default in (K)Ubuntu. If not, it can be installed:

```
sudo apt-get install libreoffice
```

Open Word 2007 Documents in LibreOffice

The latest edition of LibreOffice opens .docx (i.e. Word 2007) documents by default.

Open Office

Open Office (http://www.openoffice.org) was installed by default in older versions of (K)Ubuntu. It has been replaced by LibreOffice (which is similar) and is no longer available in (K)Ubuntu.

Calligra

Calligra (http://www.calligra.org) is a KDE-oriented office suite that is fork of (and replaces) KOffice. It includes applications for word processing (Words (http://www.calligra.org/words/)), graphics and painting (Karbon (http://www.calligra.org/karbon/) and Krita (http://www.calligra.org/krita/)), presentation and diagrams (Stage (http://www.calligra.org/stage/) and Flow (http://www.calligra.org/flow/)), spreadsheets (Sheets (http://www.calligra.org/sheets/)), databases (Kexi (http://www.calligra.org/kexi/)), and project management (Plan (http://www.calligra.org/plan/)). Install:

```
sudo apt-get install calligra
```

AbiWord

AbiWord (http://www.abisource.com/) is a fast, collaboration-enabled word processor. For the most current version see the AbiWord web site (http://abisource.com/wiki/Install_on_Ubuntu) . To install from the repositories:

```
sudo apt-get install abiword
```

GoldenDict (Multi-lingual Dictionary and Translator)

GoldenDict (http://goldendict.org/) is multi-lingual dictionary and translator that supports Babylon (https://en.wikipedia.org/wiki/Babylon_%28program%29) and StarDict (https://en.wikipedia.org/wiki/Stardict) translation dictionary files and has multiple modular plugins. Install:

```
sudo apt-get install goldendict
```

Xournal

Xournal (http://xournal.sourceforge.net/) is a free (GPL-licensed) GTK/Gnome-based application for notetaking, sketching, or keeping a journal using a stylus. Install (universe repositories must be enabled):

```
sudo apt-get install xournal
```

Special characters

- Gucharmap (https://wiki.gnome.org/Apps/Gucharmap) is a Gnome-based utility for finding special characters which are not available on the keyboard. Install:

```
sudo apt-get install gucharmap
```

PDF Files

PDF (http://en.wikipedia.org/wiki/Portable_Document_Format) is the file format used by Adobe Acrobat (which can be read by many e-book readers as well). There are many PDF-oriented utilities available in (K)Ubuntu. In a package manager, search for "pdf".

Print to a PDF file

(K)Ubuntu allows printing of any document to the PDF format by default. From any application:

File -> Print -> Print to File -> Output: PDF

View a PDF document

Evince (http://projects.gnome.org/evince/) is the default PDF document viewer in Ubuntu. PDF files are associated by default with Evince, so clicking on a PDF file (from a file manager such as Nautilus) will open it with Evince. Evince can also be started:

Menu -> Office -> Evince

Scan to a PDF file

Gscan2pdf (http://gscan2pdf.sourceforge.net/) is a utility to do exactly that: scan to a PDF file. Multiple options for scanning can be set. Install:

```
sudo apt-get install gscan2pdf
```

PDF-Shuffler (PDF file management)

PDF-Shuffler (http://sourceforge.net/projects/pdfshuffler/files/) is a free GTK-based utility to manipulate multiple PDF files, allowing individual pages or entire PDF documents to be re-arranged, rotated, merged, or deleted. This is an essential tool for working with PDF files. Install:

```
sudo apt-get install pdf-shuffler
```

Run:
Menu -> Office -> PDF-Shuffler

MaxView (PDF file management)

MaxView (http://sourceforge.net/projects/maxview/) is a utility to capture, manipulate and rearrange, and print .pdf and .max files. Written in Qt, it is similar in some respects to Paperport.

- Download (http://sourceforge.net/projects/maxview/files/maxview0.7-2/) and install the .deb package (use *i386* instead of *amd64* if using a 32-bit OS):

```
wget -O maxview_current.deb http://sourceforge.net/projects/maxview/files/maxview0.7-2/maxview_0.7-2_amd64_maverick
```

```
sudo dpkg -i maxview_current.deb
```

- Start MaxView in a GUI by creating a menu item with the Command: maxview */home/user*, where */home/user* is the directory in which you wish MaxView to start.

PDFMod (PDF file management)

PdfMod (http://live.gnome.org/PdfMod) is a Gnome-based application to reorder, rotate, and remove pages, export images from a document, edit the title, subject, author, and keywords, and combine documents via drag and drop. Install:

```
sudo add-apt-repository ppa:pdfmod-team/ppa
sudo apt-get update
sudo apt-get install pdfmod
```

PDFedit (PDF file editor)

PDFedit (http://pdfedit.petricek.net/en/index.html) is a free (GPL-licensed), Qt-based PDF file editing and manipulation program that uses a GUI for editing. Install:

```
sudo apt-get install pdfedit
```

Import PDF files into a word processor

Import PDF files into LibreOffice Writer

PDF files can be imported (http://www.libreoffice.org/features/extensions/) into the LibreOffice Writer word processor as a hybrid document (not a scanned character document) by installing:

```
sudo apt-get install libreoffice-pdfimport
```

Import PDF files into KWord

Kword is the Word Processor package in KOffice. It allows the importing of PDF files by default.

PDF-XChange (PDF file editor)

PDF-XChange (http://www.tracker-software.com/product/pdf-xchange-viewer) is a free Windows-based application to view, modify, or perform simple editing of PDF files. It works under Wine.

DjVu files

DjVu (http://en.wikipedia.org/wiki/DjVu) is an open source file format that is an alternative to PDF. Files in this format are more compact while retaining image-layer separation of images and text. DjVu files can be read by both Evince (in Ubuntu) and Okular (in Kubuntu).

- A PDF to DjVU convertor (pdf2djvu (http://code.google.com/p/pdf2djvu/wiki/ManualPage)) can be installed:

```
sudo apt-get install pdf2djvu
```

- A utility to scan documents to DjVU format (gscan2pdf (http://gscan2pdf.sourceforge.net/)) can be installed:

```
sudo apt-get install gscan2pdf
```

- A standalone DjVU document viewer can be installed:

```
sudo apt-get install djview4
```

- A utility to convert DjVU documents to PDF format (djvu2pdf (http://0x2a.at/s/projects/djvu2pdf)) can be installed:

```
sudo apt-get install djvulibre-bin ghostscript
wget http://0x2a.at/site/projects/djvu2pdf/djvu2pdf_0.9.2-1_all.deb
sudo apt-get install djvu2pdf_0.9.2-1_all.deb
```

CHM files

CHM (http://en.wikipedia.org/wiki/Microsoft_Compiled_HTML_Help) files are proprietary Microsoft Compiled HTML format help files used in Windows 98 (through Windows 7).

CHM file viewers

- kchmviewer (http://sourceforge.net/projects/kchmviewer/) is a Qt-based CHM file viewer (which can be used with KDE / Kubuntu). Install:

```
sudo apt-get install kchmviewer
```

- chmsee (http://code.google.com/p/chmsee/) is a GTK-based CHM file viewer (which can be used with Ubuntu). Install:

```
sudo apt-get install chmsee
```

- xchm (http://sourceforge.net/projects/xchm/) is a CHM file viewer for Linux. Install:

```
sudo apt-get install xchm
```

CHM file conversion

- Calibre can be used to convert .CHM files to a wide variety of other formats, including

other eBook formats.

- chm2pdf (http://code.google.com/p/chm2pdf/) is a utility to convert .CHM files to .PDF. Install:

```
sudo apt-get install chm2pdf
```

Convert a file (also see these tips (http://code.google.com/p/chm2pdf/wiki/HowToUse) or use *man chm2pdf* in a command line terminal):

```
chm2pdf --book inputfilename.chm outputfilename.pdf
```

The option *--webpage* can be used instead of *--book* to give different formatting.

- arCHMage (http://sourceforge.net/projects/archmage/) is a Python-based utility to extract text, HTML formatting, images, and CSS styles from the .CHM file. (See the ArCHMage website (http://archmage.sourceforge.net/) for more instructions.) Install:

```
sudo apt-get install archmage
```

eBooks

FBReader (e-book reader)

FBReader (http://www.fbreader.org/) is a free cross-platform e-book reader, based on the GTK platform. Install:

```
sudo apt-get install fbreader
```

Calibre (eBook conversion)

Calibre (http://calibre-ebook.com/help) is an eBook reader, library manager, and tool for conversion between many eBook formats (including the .epub format). Install:

```
sudo apt-get install calibre
```

- eBook conversion examples and tips are here.

Sigil (eBook editing and conversion)

Sigil (http://code.google.com/p/sigil/) allows creation and editing of an eBook in .epub format and conversion from other formats. Download and install the binary from the website.

eCub (eBook editing and conversion)

eCub (http://www.juliansmart.com/ecub#linux) allows creation and editing of an eBook in .epub format and conversion from other formats. Download and install the .deb package from the website.

QR Codes

qrencode

Qrencode (http://fukuchi.org/works/qrencode/index.html) is a command line utility to encode any line of text (such as a URL) into a QR encoded (http://en.wikipedia.org/wiki/QR_code) .PNG graphic image. Install:

```
sudo apt-get install qrencode
```

- For instructions for command-line usage, in a command line terminal open the manual:

```
man qrencode
```

- Example usage (from a command-line terminal):

```
qrencode -o generatedimage.png "Have a Nice Day"
```

  which will create a .png image showing the QR code for the simple text *Have a Nice Day* (note the usage of parentheses to accommodate the spaces in the text), or use

```
qrencode -o generatedimage.png http://ubuntuguide.org
```

  to create a .png image showing the QR code for the URL of Ubuntuguide.

- Qr-code-creator (https://launchpad.net/qr-code-creator/) is a GUI for qrencode. Download and install the .deb package directly from the Launchpad site.

qtqr (QR encoder/decoder GUI)

QR Tools (https://launchpad.net/qr-tools) comprises a Python-based backend for manipulating QR codes (python-qrtools) and a GUI (qtqr). In Quantal or later, install:

```
sudo apt-get install qr-tools
```

In earlier versions download and install the .deb packages *qtqr_1.2_all.deb* and *python-qrtools_1.2_all.deb* from the QR Tools Launchpad (https://launchpad.net/qr-tools) site.

qreator (QR encoder GUI)

Qreator (https://launchpad.net/~qreator-hackers/+archive/qreator-stable) is a GUI-based QR code generator. See the installation instructions at the Launchpad site.

QR code viewers

- Zbar (http://zbar.sourceforge.net/) is a free open-source barcode and QR code scanner that recognizes many formats. Install the utilities and the GTK-bindings:

```
sudo apt-get install zbar-tools libzbargtk0
```

- For Android phones, a free, simple (ad-free) QR code scanner is Obsqr (http://f-droid.org/repository/browse/?fdid=trikita.obsqr&fdpage=12) , whose .apk can be downloaded and installed directly from the F-Droid site listed.

Scripts and Screenplays

- Trelby (http://www.trelby.org/) is an open source alternative to Final Draft. A .deb package can be downloaded from the website and installed directly.

- Using a MediaWiki extension, a screenplay can be written in MediaWiki, allowing conversion to other formats.

Personal Information Managers

Kontact Personal Information Manager

Kontact (http://kontact.kde.org/) is the default PIM included with Kubuntu. Kontact includes email, an address book, a calendar, reminders, pop-up notes, a link to the Akregator News/RSS (http://en.wikipedia.org/wiki/RSS) reader, time-tracking, and more. Its many functions resemble MS-Outlook. Through connectors it interfaces with many groupware servers (http://kontact.kde.org/groupwareservers.php) (such as Kolab and eGroupware). Install:

```
sudo apt-get install kontact
```

BasKet Note Pads

BasKet Note Pads (http://basket.kde.org/) is a personal note-taking application that resides on your computer and can be used for creating "to-do" lists. It is great for centralising your thoughts in one place. Install it:

```
sudo apt-get install basket
```

Planner (Project planning & management)

Planner (http://www.simpleprojectmanagement.com/planner/) is an MS-Project (http://en.wikipedia.org/wiki/Microsoft_Project) -like planning and management tool.

```
sudo apt-get install planner
```

Time Tracker

You can keep track how long you use an application with a TimeTracker application. Keep records for billing or simply limit your Internet usage. See this list (http://www.linuxlinks.com/article/20120102092457744/TimeTracking.html) of similar-function apps for Linux.

- Project Hamster (http://projecthamster.wordpress.com/about/) is a time-tracking applet for the Gnome desktop. Install:

```
sudo apt-get install hamster-applet
```

- Gtimelog (http://mg.pov.lt/gtimelog/) is a simple version for GtK. Install:

```
sudo apt-get install gtimelog
```

- KTimeTracker (http://www.kde.org/applications/utilities/ktimetracker/) is the KDE version. (Also see the manual (http://docs.kde.org/development/en/kdepim/ktimetracker/index.html)). Install:

```
sudo apt-get install ktimetracker
```

Calendars

Calendar clients include

- Evolution (for Gnome / Ubuntu)
- Kontact / KOrganizer (for KDE / Kubuntu)
- Mozilla Thunderbird with Lightning Plugin

- For info on group calendar servers see this section.

Mozilla Sunbird (Calendar)

Sunbird (http://www.mozilla.org/projects/calendar/sunbird/) is a standalone group calendar client that has largely been replaced by the Lightning extension for Thunderbird and Firefox (https://addons.mozilla.org/en-US/thunderbird/addon/2313/) . Download from the website (http://www.mozilla.org/projects/calendar/sunbird/download.html) and install by clicking on the downloaded file to extract, or:

```
sudo mkdir /etc/sunbird
cd /etc/sunbird
sudo wget -O sunbird-current.tar.bz2 http://download.mozilla.org/?product=sunbird-1.0b1&os=linux64&lang=en-US
tar -xvjf sunbird-current.tar.bz2
```

Replace *os=linux64* with *os=linux* if using a 32-bit OS.

- Then create a menu item named *Sunbird* to point to the Command: /etc/sunbird/sunbird

Financial Software

For a brief introduction, see this list of 10 Linux financial tools (http://www.techrepublic.com/blog/10-things/top-10-linux-financial-tools/) .

KMyMoney (Personal Finance Management)

KMyMoney (http://kmymoney2.sourceforge.net/index-home.html) is a personal finance manager that uses double entry accounting, the method professional accountants use. It is similar to MS-MyMoney and Intuit Quicken, with automatic setup of categories for businesses. It is designed for the KDE/Kubuntu desktop (but will work in Gnome/Ubuntu). Install:

```
sudo apt-get install kmymoney2
```

GnuCash (Personal Finance Management)

GnuCash (http://www.gnucash.org/) is a free, open source GPL-licensed personal finance manager that uses double entry accounting like professional accountants. It is GTK-based (Gnome 2). The current version can be installed from source files (see the website for installation instructions), or the package version can be installed:

```
sudo apt-get install gnucash
```

Skrooge (Personal Finance Management)

Skrooge (http://skrooge.org/) is a free, GPL-licensed personal finances manager written for the KDE desktop that is able to import/export data to/from many other finance managers.

```
sudo apt-get install skrooge
```

Moneydance (Personal Finance Management)

Moneydance (http://moneydance.com/) is a commercial cross-platform Java-based personal finance manager similar to KMyMoney that sells for $50 per license.

SQL-Ledger (Enterprise Finance Management)

SQL-Ledger ERP (http://www.sql-ledger.org/) is a free, open-source, platform independent double-accounting-method system and enterprise resource planner (inventory, work and purchase orders, taxes, etc.) that uses the SQL database server (PostgreSQL/Oracle/Mysql databases). It uses a web browser for an interface and be accessed remotely. It is extremely comprehensive and is available in many languages. Install:

```
sudo apt-get install sql-ledger
```

LedgerSMB (Enterprise Finance Management)

LedgerSMB (http://www.ledgersmb.org/) is a fork of the SQL-Ledger project that offers fairly solid AR, AP, and GL tracking as well as inventory control. It is in rapid development and encourages community support. A Debian (.deb) package is available here (https://alioth.debian.org/frs/?group_id=30839) .

WebERP (Enterprise Finance Management)

WebERP (http://www.weberp.org/) is a free, open-source enterprise resource planner and accounting suite similar to SQL-Ledger that uses a web browser as an interface. It runs on the LAMP server. It is somewhat difficult to implement and use, but conforms to strict accounting guidelines. Set up your LAMP server first, then install using the web site instructions.

Phreebooks (Enterprise Finance Management)

Phreebooks (http://www.phreebooks.com/) is a free open-source enterprise resource planner and accounting suite similar to WebERP. It also runs on a LAMP server. It is in active development in 2008. A demo is available at the website.

Quasar (Enterprise Finance Management)

Quasar (http://www.linuxcanada.com/) is a proprietary Linux-based accounting suite similar to Quickbooks. For a single user without point-of-sale or networking needs, it is free. For other users it costs CA$500 per seat. An installer for KDE-based systems is here (http://outkastsolutions.co.za/outkast/index.php?option=com_docman&task=doc_details&gid=14&Itemid=31) .

Stock Market monitoring software

- BeanCounter (http://dirk.eddelbuettel.com/code/beancounter.html) - A stock portfolio performance monitoring tool. Install:

```
sudo apt-get install beancounter
```

- Smtm (http://dirk.eddelbuettel.com/code/smtm.html) - Show Me The Money is a configurable Perl/Tk stock ticker program. Written by the creator of BeanCounter.

```
sudo apt-get install smtm
```

- Qtstalker (http://qtstalker.sourceforge.net/) - commodity and stock market charting and technical analysis

```
sudo apt-get install qtstalker
```

- JStock (http://jstock.sourceforge.net/) -- a Java based portfolio manager and stock market monitoring tool. See these installation instructions (http://jstock.sourceforge.net

/help_install_upgrade.html#install-linux) .

Groupware

Groupware solutions include shared calendars, group email servers, groups address lists, group projects, and internal messaging. They require (one or more) servers with LAMP or similar server stacks.

Groupware Servers

Groupware servers are most often operated on a server platform. You can install the server version of Ubuntu (in the interest of speed) for a dedicated groupware server. Read servers.

Kolab

Kolab (http://www.kolab.org/) is the most comprehensive open-source groupware solution available and is distributed as a multi-platform solution. (It integrates easily with both Ubuntu (including Evolution) and KDE/Kubuntu (including Kontact).) It is free and open source with a GPL license (unlike other groupware solutions), yet enterprise support is also available. It is scalable to large organizations and is Outlook (MS-Exchange) and Mozilla compatible. This is a German package, however, and documentation in English can occasionally be limited. The Kolab website provides its own instructions for installation from source (http://wiki.kolab.org /index.php/Kolab2_Installation_-_Source) (currently v. 2.2 (http://www.kolab.org/pipermail /kolab-announce/2009/000083.html)). Version 2.2 includes the Horde web interface. The current beta Debian package instructions are here (http://wiki.kolab.org/index.php/Debian_-_Administrators_-_Kolab_Installation) or the OpenPkg installation instructions are here (http://files.kolab.org/server/release/kolab-server-2.2.4/ix86-debian5.0/1st.README) .

- Note: Kolab uses its own server components, and it is best to run Kolab on a dedicated server. However, it is possible to run other servers on the same machine, as long as you choose alternate ports if the server modules conflict.
- Install the compiler and other necessary stuff:

```
sudo apt-get install build-essential
```

Kolab Ubuntu package

- There is an Ubuntu/Kubuntu package for the new version of Kolab (v. 2.2), but no documentation support for it yet exists. Install:

```
sudo apt-get install kolabd
```

Manual Kolab installation

- Make a directory for the Kolab installation and make it universally accessible:

```
sudo cd /
sudo mkdir /kolab
sudo chmod 777 /kolab
```

- *Optional:* If you wish to mount kolab in its own partition, then create a new partition (using Gparted, for example). Figure out the device name of your extra partition:

```
sudo fdisk -l
```

It should be something like /dev/sda3.
Mount /dev/sda3 (or whatever your partition is) as /kolab by editing /etc/fstab:

```
sudo nano /etc/fstab
```

and adding the line:

```
/dev/sda3  /kolab  ext3  defaults,rw 0 0
```

then reboot and make sure there are no errors.

- Make a directory into which to download kolab:

```
cd /tmp
mkdir /kolabtmp
```

- Download all the current Kolab files:

```
cd /tmp/kolabtmp
wget -r -l1 -nd --no-parent http://files.kolab.org/server/release/kolab-server-2.2.2/sources/
```

- Install Kolab (as root using sudo -s):

```
sudo -s
sh install-kolab.sh 2>&1 | tee kolab-install.log
```

- Reboot your system.
- Stop Kolab services and run the configuration utility:

```
sudo /kolab/bin/openpkg rc all stop
sudo /kolab/sbin/kolab_bootstrap -b
```

Obviously, you should know all your details, such as your fully qualified host name (which you can determine from hostname -f), domain details, etc., before doing this step. If you are not familiar with OpenLDAP (http://www.openldap.org/) and LDAP (http://en.wikipedia.org/wiki/LDAP) basics, you should learn about it, as Kolab uses the slapd OpenLDAP server daemon.

- Restart all Kolab services:

```
sudo /kolab/bin/openpkg rc all start
```

- Login to the web administrator interface using "manager" and the password you set at bootstrap configuration:

```
https://yourhost.yourdomain.name/admin
```

Citadel

Citadel (http://www.citadel.org/) is a turn-key fully open source groupware solution (that is both KDE and Kolab-1 compliant). Based on a bulletin-board framework spanning over 20 years, it is user friendly and interfaces with both KDE and Gnome apps and also has a web-based client. It is also WebDAV compliant and can be used with Thunderbird.

- Install the Citadel server:

```
sudo apt-get install citadel-server
```

- Install the Citadel client:

```
sudo apt-get install citadel-client
```

- Install both:

```
sudo apt-get install citadel-suite
```

eGroupware

eGroupware (http://www.egroupware.org/) is a robust and stable free open source groupware solution (with GPL license) based on the LAMP stack (the default server stack included with Ubuntu Server) and the Postfix mail server (both of which should be installed first). There is a new version recently available, with a new corporate sponsor in Germany and a commercial enterprise version. Compatibility with many clients has been improved. Egroupware provides the easiest installation and quickest setup time of all groupware solutions. Much of the documentation for the current version, unfortunately, is not in English.

```
sudo apt-get install egroupware
```

Open-Xchange

Open-Xchange (http://www.open-xchange.com /wiki/index.php?title=Quick_install_guide_for_the_Server_Edition_Ubuntu8.04) is a proprietary groupware solution (meant as an MS-Exchange replacement) that has released a "community

edition" based on commercial versions. The latest .deb package is for Hardy Heron 8.04. It is compliant with many different types of clients, including Kontact, Outlook, and Palm PDAs. Installation instructions are at the website and are not trivial.

OpenGroupware

OpenGroupware (http://www.opengroupware.org/) is a groupware solution based on the postgreSQL database. There is an enterprise version and a limited open source version, and development appears to have been stagnant in 2008. Installation must be from source, as packages are very outdated. See the website for details.

Zarafa

Zarafa (http://zarafa.com/?q=en/content/community-0) is the leading European MS-Exchange replacement/groupware solution. It is proprietary, but a GPL-licensed (except for trademarks) free open-source community edition was released in 2008. Download instructions are available from the website.

Zimbra

Zimbra (http://www.zimbra.com/downloads/os-downloads.html) is a proprietary groupware solution (now owned by VMWare) that offers an open source "community edition". Although currently free, the community edition is limited in features and does not have a GPL license. All submitted modifications and contributions become the property of VMWare. See the Zimbra wiki (http://wiki.zimbra.com/wiki/Main_Page) .

A Beta version for Lucid Lynx 10.04 LTS is available for 64-bit users, or the older Hardy 8.04 version can be used.

SchoolTool

SchoolTool (http://www.schooltool.org/) is a free open source groupware solution for use in primary and secondary schools which includes calendaring, gradebooks, attendance records, and student information databases. It was created with the help of the Shuttleworth Foundation (which also sponsors Ubuntu). See these installation instructions (http://book.schooltool.org/htmlhelp/install.html) .

SugarCRM Community Edition

SugarCRM (http://www.sugarcrm.com/crm/download) is a customer-relationship management system that is used to co-ordinate a sales force (sales, marketing, support, project management, calendaring). SugarCRM has a community edition that is one of the most widely used. A LAMP server stack should be installed first (sudo tasksel install lamp-server). Extract SugarCRM to /var/www and then logon to http://localhost/SUGAR-FOLDER. Alternatively, for a new server SugarCRM provides a (binary) integrated installation (http://www.sugarcrm.com/crm/download#installers) of the LAMP stack with the SugarCRM Community Edition.

Groupware Clients

Many groupware solutions have connectors to interface with clients such as Kontact/KMail and Mozilla Thunderbird (or SeaMonkey).

Evolution Exchange

The Evolution Exchange connector adds connectivity (using Outlook Web Access) to the Evolution suite for MS Exchange 2000 and 2003. Install:

```
sudo apt-get install evolution-exchange
```

Kontact Personal Information Manager

The Kontact Personal Information Manager, included in Kubuntu by default, interfaces with many groupware servers (http://kontact.kde.org/groupwareservers.php) .

KDE Groupware Wizard

Kubuntu provides a wizard (script) to help clients (such as Kontact/Kmail) connect to a groupware server. Currently supported groupware servers are Kolab, eGroupware, SUSE Linux Openexchange, and Novell Groupwise.

Zimbra Desktop

Zimbra Desktop (http://www.zimbra.com/products/desktop.html) is a desktop that collaborates with Zimbra servers. See the Zimbra Desktop FAQ (http://wiki.zimbra.com /wiki/Zimbra_Desktop_Download_and_Install_FAQ) . For more info also see this Ubuntu Forums Zimbra Desktop Installation thread (http://ubuntuforums.org/showthread.php?p=10634207) .

Oracle Calendar Desktop Client

The Oracle Calendar Desktop Client (http://www.oracle.com/technology/products/cs/user_info /ocalendar/desktop_index.html) is proprietary calendaring software for use with Oracle groupware/database systems.

Download Oracle Calendar Desktop Client:

```
wget http://www.k-state.edu/infotech/calendar/oracle-10-clients/DesktopClients/Linux/cal_linux_1011.tar.gz
```

Extract:

```
tar -xvf cal_linux_1011.tar.gz
```

Change into the extracted files directory:

```
cd OracleCalendar_inst/
```

Prepare the files:

```
mv cal_linux cal_linux.bak; cat cal_linux.bak | sed "s/export LD_ASSUME_KERNEL/#xport LD_ASSUME_KERNEL/" > cal_linu
```

Change permissions:

```
chmod +x gui_install.sh cal_linux
```

Start the GUI installer:

```
sudo sh gui_install.sh
```

Group Calendars

DAViCal Calendar Server

DAViCal (http://wiki.davical.org/w/Main_Page) is a CalDAV (http://en.wikipedia.org/wiki/CalDAV) , postgreSQL, Apache and php-based shared Calendar server that works with Mozilla Thunderbird/Lightning/Sunbird, Evolution, Kontact, aCal (http://acal.me/wiki/Main_Page) (for Google Android), and other calendar clients. Install:

```
sudo apt-get install davical
```

Then see these detailed installation instructions (http://wiki.davical.org/w/Ubuntu_Maverick) .

Radicale Calendar Server

Radicale (http://radicale.org) is a simple-to-use CalDAV contact and calendar server. Install:

```
sudo apt-get install radicale
```

- To use Radicale with Evolution, see this info (http://radicale.org/user_documentation/#evolution) . It can also be used with the Mozilla Thunderbird Lightning (http://radicale.org/user_documentation/#lightning) calendar plugin and with the Google Android aCal (http://radicale.org/user_documentation/#id7) CalDAV calendar app.

Darwin Calendar Server

Darwin Calendar Server (http://trac.calendarserver.org/) is an open-source port of Apple's CalDAV (http://en.wikipedia.org/wiki/CalDAV) -based calendar server that works with Mozilla Thunderbird/Lightning/Sunbird, Evolution, and other calendar clients. Install version 1.2 from the repositories (then see the website for usage instructions):

```
sudo apt-get install calendarserver
```

WebCalendar

WebCalendar (http://www.k5n.us/webcalendar.php?topic=About) is an ICS (http://en.wikipedia.org/wiki/ICalendar) -based server for group calendars that can use many different databases as the backend, is written in PHP, and is compatible with clients such as Sunbird/Thunderbird (Lightning), Apple iCal, and Evolution. The newest version can also be viewed using RSS (http://en.wikipedia.org/wiki/RSS) clients. See the website and the wiki (http://www.k5n.us/wiki/index.php?title=Main_Page) for installing the newest (1.2) version. Install the older (1.05) version from the repositories:

```
sudo apt-get install webcalendar
```

Mail servers

Postfix / Dovecot (Mail Server)

Postfix (http://www.postfix.org/) is a free open source mail server. It interfaces directly to Dovecot (http://www.dovecot.org/) , the free open source IMAP (http://en.wikipedia.org/wiki/Internet_Message_Access_Protocol) and POP3 (http://en.wikipedia.org/wiki/Post_Office_Protocol) server. For more information see the official Ubuntu documentation (https://help.ubuntu.com/12.04/serverguide/email-services.html) . The dovecot-postfix metapackage installs the components and customizes the configuration files to use the Maildir (mail spooling) folder system by default. Imap and Pop3 modules, SMTP, and SASL/TLS (with self-signed certificates) are installed by default.

```
sudo apt-get install dovecot-postfix
```

For tips on setting up a personal mail server, see here.

Squirrelmail (webmail)

SquirrelMail (http://squirrelmail.org/) is an open source (GPL-licensed) webmail package (written in PHP) for use with an IMAP (or other type of) mail server. It is efficient and effective. See the Ubuntu Community documentation (http://help.ubuntu.com/community/Squirrelmail) .

```
sudo apt-get install squirrelmail
```

Roundcube (webmail)

Roundcube (http://roundcube.net/about) is an open source (GPL-licensed) webmail package (written in AJAX) for use with an IMAP (or other type of) mail server. It requires a LAMP (or similar) server stack. See the Ubuntu Community documentation (http://help.ubuntu.com/community/Roundcube) .

```
sudo apt-get install roundcube
```

iRedMail

iRedMail (http://www.iredmail.org/install_iredmail_on_ubuntu.html) is an integrated package that includes Dovecot, Postfix, a choice of OpenLDAP (with phpLDAPAdmin) or MySQL for the database, Roundcubemail or Squirrelmail for web-based mail access, phpAdmin, PostfixAdmin, and AWStats. It is optimized for Precise 12.04 LTS and is best installed on a fresh server (since it resets many email configuration files). There is a community edition with many of the features of the commercial edition.

Wiki software

Wiki software allows an organization to have a manual that can be edited by a number of collaborators. Wikipedia is the best known example.

MediaWiki

MediaWiki (http://www.mediawiki.org) is the free, open source server software that Wikipedia uses. It is scalable to very large uses. It runs on the LAMP server stack (which uses the MySQL database and is available as an installation option with the (K)ubuntu server), or it can be used with a PostgreSQL database. See these detailed instructions. (Other instructions are also available here (http://www.mediawiki.org/wiki/Manual:Running_MediaWiki_on_Ubuntu) .) Install from the repositories:

```
sudo apt-get install mediawiki
```

- Edit the config file so it recognizes MediaWiki:

```
sudo nano /etc/mediawiki/apache.conf
```

Uncomment (remove the #) the line:

```
Alias /mediawiki /var/lib/mediawiki
```

- Restart apache2:

```
sudo /etc/init.d/apache2 restart
```

- Run/install MediaWiki by logging into:

```
http://localhost/mediawiki
```

You will be prompted for configuration variables to be set. The trickiest is the MySQL user/password. Hopefully you remember your MySQL superuser that you set at the time of LAMP (or MySQL) installation.

- Copy your local settings configuration file to /etc/mediawiki (and make a backup of the original):

```
sudo cp /var/lib/mediawiki/config/LocalSettings.php /etc/mediawiki
sudo mv /var/lib/mediawiki/config/LocalSettings.php /var/lib/mediawiki/config/LocalSettings_at_install.php
```

Edit your configuration variables there:

```
sudo kate /etc/mediawiki/LocalSettings.php
```

- If you are using a virtual host server, make a symbolic link (named in this example *mywiki*) from your /usr/share/mediawiki installation folder to your /var/www folder:

```
sudo ln -s /usr/share/mediawiki /var/www/mywiki
```

then make sure you have an apache2 virtual hosts configuration file (in /etc/apache2/sites-available) that points to /var/www/*mywiki* as the DocumentRoot. Make a symbolic link from your virtual host configuration file in /etc/apache2/sites-available to /etc/apache2/sites-enabled to enable it. Restart apache2 after enabling the sites. (Warning: MediaWiki is not secure at installation and can be easily hacked by new users. Do not publish your wiki to the Internet before reading all the instructions and changing the configuration file (LocalSettings.php) so that it is more secure.) You would then access the database at:

```
http://my.virtualwikihost.org
```

Moin Moin

Moin Moin (http://moinmo.in/) is free, open source (GPL-licensed) wiki software written using Python, with a large community of users, including the Apache, Debian, and Ubuntu wikis. See these Ubuntu installation instructions (https://help.ubuntu.com/12.04/serverguide/moinmoin.html) . Install:

```
sudo apt-get install python-moinmoin
```

Twiki

Twiki (http://twiki.org) is an open source wiki engine used by many small to medium size companies internally. It has an active development team with multiple plugins. See the website for installation instructions. Install:

```
sudo apt-get install twiki
```

TiddlyWiki

TiddlyWiki (http://www.tiddlywiki.com/) is an open source personal wiki. It is ideal for creating

a list of things to do, note taking, or as a collaboration tool for a small team. It is a single HTML file that can reside on your computer or can even be uploaded to a web server and be used as a simple website. It is developed using a Firefox browser as an interface. Installation instructions are on the website.

Web Publishing

Drupal (Web content publishing)

Drupal (http://drupal.org/) is the most powerful open-source website creation and content collaboration tools. A modular approach to website building, from simple out-of-the-box websites to complex sites is possible with a short learning curve. Get more info on how to get started (http://drupal.org/getting-started) . Drupal requires an installation of a LAMP server stack; if you have not already installed LAMP, it will be installed along with Drupal. I have found it easier to use the MySQL (http://en.wikipedia.org/wiki/MySQL) database (the "M" in LAMP), but Drupal can also integrate with PostgreSQL (http://en.wikipedia.org/wiki/Postgresql) if you have it installed.

Drupal7

Drupal 7 is available as a package from a package manager or from the command-line terminal:

```
sudo apt-get install drupal7
```

- See these instructions (http://drupal.org/node/570162) for upgrading from Drupal6 to Drupal7.

You can then also see these installation tips for installing through the browser, then see these Drupal site building tips. A Drupal/Ubuntu users group is found at Drubuntu (http://groups.drupal.org/drubuntu) .

Drupal6

Drupal 6 is available as a package from a package manager or from the command-line terminal:

```
sudo apt-get install drupal6
```

- After everything is installed (and the problems below sorted out), restart the apache2 server:

```
sudo /etc/init.d/apache2 restart
```

- Finish installation through your browser:

```
http://localhost/drupal6/install.php
```

You can then also see these installation tips for installing through the browser, then see these Drupal site building tips. A Drupal/Ubuntu users group is found at Drubuntu (http://groups.drupal.org/drubuntu) .

Installation quirks

Exim vs. Postfix

Exim (http://www.exim.org/) and Postfix (http://www.postfix.org/) are mail handlers. I had installed Postfix at the time I installed my Ubuntu server (but was not using it). Drupal6 uses Exim, however, and therefore removes Postfix at installation and installs Exim instead. Therefore, it is better not to use Drupal6 on a mail server that uses Postfix.

WordPress

WordPress (http://wordpress.org/) is the most popular free open source web content manager that started as a blog tool and now incorporates many publishing elements. For bloggers and small to medium-sized websites, WordPress provides the fastest installation and customization process with many modules. WordPress requires an installation of a LAMP server stack first. Then install:

```
sudo apt-get install wordpress
```

- Make a symbolic link from your Apache2 www folder to your installation folder and install a new MySQL database named *localhost* to use with WordPress:

```
sudo ln -s /usr/share/wordpress /var/www/wordpress
sudo bash /usr/share/doc/wordpress/examples/setup-mysql -n wordpress localhost
```

Note: If you already know the name of your (virtual) host URL for WordPress, then use it as the name of your database instead of localhost. For example, my URL is *mysite_x.homeserve.org* so my command is:

```
sudo bash /usr/share/doc/wordpress/examples/setup-mysql -n wordpress mysite_x.homeserve.org
```

- If you will access your WordPress server through a virtual host, then create your virtual host configuration file in the /etc/apache2/sites-available folder. Once you have edited the file, make a symbolic link from it to the /etc/apache2/sites-enabled folder. Restart apache2:

```
sudo /etc/init.d/apache2 restart
```

- Install WordPress through a browser:

  http://localhost/wordpress

  or, if you are using a virtual host:
  http:/*mysite_x.homeserve.org*/wordpress

Note: The Jaunty repositories contain version 2.7.1, which is subject to a security worm (http://wordpress.org/development/) . If you install this version, please update (http://codex.wordpress.org/Upgrading_WordPress) immediately to the current version from the Tools -> Upgrade menu. (Alternatively, install the current source version from the website.)

For the automatic updater to work, all the WordPress files, folders, and subfolders must be owned by www-data (which is also the owner of the apache2 process) prior to updating.

```
sudo chown -R www-data /usr/share/wordpress
```

Joomla (Web content publishing)

Joomla (http://www.joomla.org/) is a powerful open source website creation and content management tool that allows website creation for use in every arena from the simple to complex corporate environments. Info for beginners (http://docs.joomla.org/Beginners) is a good place to start.

Scribus (Desktop publishing)

Scribus (http://www.scribus.net/) is an open-source package that provides professional-appearing desktop publishing.

```
sudo apt-get install scribus
```

Plone (Content Management System)

Plone (http://plone.org/) is a free, open source (GPL-licensed) multi-platform content management system used by many large organizations around the world. It is available with an integrated installer here (http://plone.org/products/plone) . Some users have had some difficulties in Jaunty, due to changes in Python.

Gallery (Photo album website)

Gallery (http://gallery.menalto.com/) is a PHP-based method of presenting a photo album on a website. A Drupal interface (http://drupal.org/project/gallery) is also available for Gallery2.
Install:

```
sudo apt-get install gallery2
```

phpBB (Forums)

phpBB (http://www.phpbb.com/) is the leading open source platform for Forums. A LAMP server stack (or PostgreSQL database instead of MySQL) will be required and should be installed first. Then make sure the universe repositories are enabled and install:

```
sudo apt-get install phpbb3
```

Distance teaching

Moodle

Moodle (http://moodle.org/) is a free open source platform for hosting online learning courses. It can be integrated with webinar software. A LAMP server installation is required (sudo tasksel install lamp-server). Also find free Moodle themes here (http://moodle.org/mod/data/view.php?id=6552) . Install:

```
sudo apt-get install moodle
```

- Database server software for Moodle: *mysql-server* -> follow remainder of instructions. Assuming the database is hosted on the same computer as the one Moodle is being installed upon, accept localhost for the options when prompted.
- Edit Moodle configuration options (if needed). (Use the *gedit* text editor instead of *kate* if using Ubuntu instead of Kubuntu.):

```
sudo kate /etc/moodle/config.php
```

- Edit Moodle apache2 configuration file (if needed). (Use the *gedit* text editor instead of *kate* if using Ubuntu instead of Kubuntu.):

```
sudo kate /etc/moodle/apache.conf
```

- Finish installation through the browser. (I recommend the "unattended" installation.)

  http://localhost/moodle/admin

For more information, see these detailed tips. Moodle can also be integrated with other CMS systems (http://docs.moodle.org/21/en/Integrations) , as well.

Claroline

Claroline (http://www.claroline.net/) is a free open source platform for hosting e-learning courses and online student collaboration. A LAMP server installation is required. Installation is from source files available at the website, with instructions found here (http://www.claroline.net/documentation/tutorials.html) .

Dokeos

Dokeos (http://www.dokeos.com/) has a free learning platform, but also a medically-oriented proprietary platform that includes modules for case presentations and imaging. It is widely used in Europe.

Software Development

Spyder

Spyder (http://code.google.com/p/spyderlib/) is a powerful interactive Open Source development environment for the Python language with advanced editing, interactive testing, debugging, and introspection features.

```
sudo apt-get install spyder
```

Eric

Eric (http://eric-ide.python-projects.org/) is a full featured IDE and Python and Ruby editor, written in Python. It is based on the cross-platform Qt Gui toolkit, integrating the highly flexible Scintilla editor control. It is a quick and dirty editor as well as a professional project management tool (integrating many advanced Python features). Eric4 includes the integration of a downloadable plug-in system.

```
sudo apt-get install eric
```

Kompozer Web Development Editor

Kompozer (http://kompozer.net/) is a Gecko (http://en.wikipedia.org/wiki/Gecko_(layout_engine)) -based web authoring system that combines web page editing with web file management in a WYSIWYG manner. It supports XML, CSS, and JavaScript in an XUL architecture.

```
sudo apt-get install kompozer
```

Quanta Plus (Web IDE)

Quanta Plus (http://quanta.kdewebdev.org/) is an integrated development environment integrated with the KDE desktop. It allows webpage development, database design, and XML design and scripting, for example, using multiple development tools. The latest stable version is 3.5, however, and integrates with the KDE 3.5 environment (Ubuntu Hardy Heron). You should therefore use Ubuntu Hardy Heron with this product. (There is also a commercial version (Quanta Gold), also oriented towards KDE 3).

```
sudo apt-get install quanta kompare kxsldbg cervisia
```

Netbeans IDE

Netbeans (http://www.netbeans.org/features/) is a free open-source integrated development environment used to create applications using Ajax, Ruby, pHp, Groovy, Java, Javascript, C++, and other scripting tools.

```
sudo apt-get install netbeans
```

BlueFish Web Development Editor

BlueFish (http://bluefish.openoffice.nl/) is a GTK-based (Gnome-oriented) editor to write websites, scripts and programming code. It supports perl, Python, pHp, CSS, XML, Java, Javascript, C, SQL, and other formats.

```
sudo apt-get install bluefish
```

Gobby (Multi-user development)

Gobby (http://gobby.0x539.de/trac/) is a free, multi-platform open source collaborative editor supporting multiple documents in one session and a multi-user chat. Install:

```
sudo apt-get install gobby
```

Eclipse IDE

Eclipse (http://www.eclipse.org/home/newcomers.php) is a free open-source cross-platform integrated development environment with plugin support for a large set of programming languages, e.g. Java, C/C++, Python, PHP.

```
sudo apt-get install eclipse
```

Qt Creator

Qt Creator (http://qt-project.org/wiki/Category:Tools::QtCreator) is a lightweight, cross-platform integrated development environment (IDE) for the Qt application framework.

```
sudo apt-get install qtcreator
```

Game Engines

- See this section for a list of open-source game engine development environments.

Search Engines

Sphinx

Sphinx Search (http://sphinxsearch.com/about/sphinx/) is an open source full text search server. See their documentation (http://sphinxsearch.com/docs/) for usage details. Install:

```
sudo apt-get install sphinxsearch
```

Online Storage

- The recent ease of cloning filesystems and the promiscuity of datacenters has placed a great deal of sensitive data at risk when files are remotely hosted at a site not under your complete control. The reliability and security of online storage is low, and, in fact, can often be a means for intercepting or otherwise changing those files that have been placed on the remote servers. Further, any data left on public storage devices in the US for more than 180 days are subject to search and seizure by government agencies there. Always encrypt sensitive private files stored on public servers.

  It is almost always more secure to host your own server(s) in house and to limit the traffic and access to your files and servers to members of your own organization. Learning how to run your own servers is worth the effort, and powerful hardware on which to run them is inexpensive these days.

FTP (online file transfer)

- See this section on FTP servers for more information about vsftp and proftp.
- See this section on FTP clients for more information about FileZilla.

  Also see these FTP tips.

WebDAV (online folders)

See this section on WebDAV for more information about WebDAV (http://en.wikipedia.org/wiki/WebDAV) servers and clients.

Dropbox (online cloud storage)

Dropbox (https://www.dropbox.com/) is a free but proprietary online remote hosting service for private files (similar to the free open-source alternative SparkleShare). Be careful of any storage solution not under your complete control (especially proprietary solutions); they are insecure and should be used for temporary storage of non-critical files only (as an alternative to sending files by email).

- Install prerequisities (several may already be installed on your system):

```
sudo apt-get install sqlite3 python python-gpgme
```

- Download (https://www.dropbox.com/install?os=lnx) and install the Dropbox client daemon:

```
wget -O dropbox-current_amd64.deb https://www.dropbox.com/download?dl=packages/ubuntu/dropbox_1.6.0_amd64.deb
```

```
sudo dpkg -i dropbox-current_amd64.deb
sudo rm dropbox-current_amd64.deb
```

or for the 32-bit version:

```
wget -O dropbox-current_i386.deb https://www.dropbox.com/download?dl=packages/ubuntu/dropbox_1.6.0_i386.deb
sudo dpkg -i dropbox-current_i386.deb
sudo rm dropbox-current_i386.deb
```

- The default Dropbox client installation will also install an add-on plugin for the Nautilus file manager. If not, install the plugin:

```
sudo apt-get install nautilus-dropbox
```

- See this article (http://absolutegizmos.com/seed-your-torrents-with-a-free-seedbox-without-using-your-own-computer/) if interested in using Dropbox as a webseed (http://en.wikipedia.org/wiki/Web_seed#Web_seeding) for BitTorrent. Because Dropbox is insecure, you may wish to consider installing Dropbox within a quarantined virtual machine and run the virtual machine containing Dropbox only when connected to a secure Internet connection (such as through Tor).

Google Drive (online cloud storage)

Google Drive (http://en.wikipedia.org/wiki/Google_Drive) is a free but proprietary online remote hosting service for private files (similar to the free open-source alternative SparkleShare). Be careful of any storage solution not under your complete control (especially proprietary solutions); they are insecure and should be used for temporary storage of non-critical files only (as an alternative to sending files by email).

- Grive (http://www.lbreda.com/grive) is a free, open-source command-line API for Linux systems to interface with Google Drive.
  - Download and install a 32-bit or 64-bit .deb package here (http://www.ubuntuupdates.org/package/webupd8/precise/main/base/grive) .
  - Alternatively, a method for installation from a private PPA repository (https://launchpad.net/~nilarimogard/+archive/webupd8) is also provided by WebUpd8 here (http://www.webupd8.org/2012/05/grive-open-source-google-drive-client.html) .

Other online webhosts

- There are many services offering online webhosting with a wide range of included services. No online webhost should be considered secure; however, the usage of a public webhost may be suitable for certain public, non-sensitive needs. Many webhosts go offline or disappear altogether without notice, so backup and security precautions are essential at all times.

- Here (http://www.free-webhosts.com) is a list of free webhosts, all of which should be assumed to be insecure.
- Many users use public webhosts through Tor for temporary storage of files only, and never for unencrypted sensitive, private files. A popular method is to sign up for a webhost account (through Tor or from an anonymous IP address) using an anonymous email account. Filezilla with Tor is subsequently used to securely transfer files to the webhost. (See this article (http://absolutegizmos.com/seed-your-torrents-with-a-free-seedbox-without-using-your-own-computer/) if interested in using the webhost as a webseed (http://en.wikipedia.org/wiki/Web_seed#Web_seeding) for BitTorrent.) Some users access the free webhost only from within a quarantined virtual machine.

Personal repositories

(K)Ubuntu uses Debian (.deb) packages. Individuals or organizations can create repositories for personal or specialized use. See the Debian wiki introduction (http://wiki.debian.org/HowToSetupADebianRepository) . Also see this Ubuntu community advice (https://help.ubuntu.com/community/Repositories/Personal) and this (https://help.ubuntu.com/community/AptGet/Offline/Repository) .

mini-dinstall

Using mini-dinstall with dput, a simple repository can be created. This can then be copied to an online server for public or private access. See this tutorial (https://help.ubuntu.com/community/LocalAptGetRepository) and this (http://www.drelmo.net/2007/09/17/setting-up-your-own-ubuntu-repository-on-dreamhost/) .

Debarchiver

DebArchiver (http://inguza.com/software/debarchiver) is a command-line utility that allows the creation of a folder-based repository. Instructions are from *man debarchiver* (in a command-line terminal). Install:

```
sudo apt-get install debarchiver
```

Version control software

Copies of software being developed at many different locations require a method to ensure that the multiple distributed copies remain synchronized. This can be done using a central repository or using a distributed synchronization technique. For further information, see the official Ubuntu documentation (https://help.ubuntu.com/12.04/serverguide/C/version-control-system.html) . Several version control platforms exist:

- Bazaar (http://bazaar.canonical.com/en/) is sponsored by Canonical and also allows distributed synchronization. Also see the official Ubuntu documentation (https://help.ubuntu.com/12.04/serverguide/C/bazaar.html) . Install Bazaar with a GTK-based GUI and Nautilus integration:

```
sudo apt-get install bzr bzr-gtk nautilus-bzr
```

- Subversion (http://subversion.apache.org/) . Now part of Apache, this is one of the most widely used systems and uses a central repository for synchronization. Also see the official Ubuntu documentation (https://help.ubuntu.com/12.04/serverguide/C/subversion.html) . Install along with Nautilus integration scripts:

```
sudo apt-get install subversion nautilus-script-collection-svn
```

- Mercurial (hg) (http://mercurial.selenic.com/) is a newer, low-resource version control system. Install:

```
sudo apt-get install mercurial
```

- CVS (http://en.wikipedia.org/wiki/Concurrent_Versions_System) was previously the most widely used system. Also see the official Ubuntu documentation (https://help.ubuntu.com/12.04/serverguide/C/cvs-server.html) . Install:

```
sudo apt-get install cvs
```

    - TkCVS (http://www.twobarleycorns.net/tkcvs.html) is a GUI frontend for both CVS and Subversion. Install:

```
sudo apt-get install tkcvs
```

Git

- Git (http://git-scm.com/) allows distributed synchronization and is currently one of the most widely used systems. Also see the Ubuntu community documentation (https://help.ubuntu.com/community/Git) . The git client can be installed:

```
sudo apt-get install git
```

  and the gitosis (http://eagain.net/gitweb/?p=gitosis.git;a=blob;f=README.rst;hb=master) server software:

```
sudo apt-get install gitosis
```

- GitK is a Tk-based Git tree visualizer. Install:

```
sudo apt-get install gitk
```

SparkleShare (Git frontend)

SparkleShare (http://sparkleshare.org) is a Git repository server/client frontend. Also see this helpful blog (http://www.upubuntu.com/2011/07/sync-files-with-sparkleshare-02-on.html) entry for installation tips on older systems. Installation is by adding a PPA repository (https://launchpad.net/~warp10/+archive/sparkleshare) and then installing:

```
sudo add-apt-repository ppa:warp10/sparkleshare
sudo apt-get update
sudo apt-get install sparkleshare
```

Maps and GPS

In addition to several online mapping services (such as Google Maps (http://maps.google.com) , MapQuest (http://www.mapquest.com/) , and the open source OpenStreetMap (http://www.openstreetmap.org)), self-contained map packages can be installed on your computer (to be used with or without Internet access).

Google Earth

Google Earth (http://earth.google.com/) gives you an annotated eagle's eye view of our planet. This is a free proprietary package (you must accept the license to use this package).

```
sudo apt-get install googleearth-package
make-googleearth-package --force
```

Doubleclick on the resulting .deb file.

-- or --

To install the latest Linux binary, download and save the GoogleEarthLinux.bin (currently version 5) package from Google Earth downloads (http://earth.google.com/intl/en/download-earth.html) . (You may alternatively download the previous version (4.3), named googleearth-linux-plus-4.3.7284.3916.bin or something similar.)

```
wget http://dl.google.com/earth/client/current/GoogleEarthLinux.bin
```

Then install:

```
chmod +x GoogleEarthLinux.bin
./GoogleEarthLinux.bin
```

Run:

K menu -> Internet -> Google Earth 3D planet viewer

You should turn off the Google Earth -> View -> Atmosphere setting, or you might see clouds everywhere and the ground won't show up.

Troubleshooting

- If Google Earth opens, shows the splash screen, and then crashes, you're probably experiencing a common issue. Running ~/google-earth/googleearth in a terminal will show this error:

./googleearth-bin: relocation error: /usr/lib/i686/cmov/libssl.so.0.9.8: symbol BIO_test_flags, version OPENSSL_0.9.8 not defined in file libcrypto.so.0.9.8 with link time reference

To fix this, browse to the folder you installed Google Earth into. (If you installed manually, this will be google-earth in your home folder.) Find the file libcrypto.so.0.9.8 and rename it to something else, like libcrypto.so.0.9.8.bak. Google Earth should now start correctly.

```
cd ~/google-earth
sudo mv libcrypto.so.0.9.8 libcrypto.so.0.9.8.bak
sudo ln -s /usr/lib/libcrypto.so.0.9.8 ~/google-earth/libcrypto.so.0.9.8
```

(Note: You can also specify /home/*user*/google-earth instead of ~/google-earth).

- On my display, I had to disable desktop effects (K menu -> System -> System Settings -> Desktop -> Desktop Effects) to get the display to work.

For other issues, see the Ubuntu help pages on Google Earth (https://help.ubuntu.com /community/GoogleEarth) . Be careful of some of the suggestions there.

For example, if you turned on OpenGL desktop effects (using K Menu -> System Settings -> Desktop -> Desktop Effects -> General -> Advanced Options) and your display goes blank and you can't restore it, you will have to edit the settings file manually from the command-line to reset your mistake.

```
nano ~/.kde/share/config/kwinrc
```

In the section title [Compositing], under the line Backend=OpenGL (or whichever backend you had selected) change the line below it to read:

```
Enabled=false
```

The will reset your display and you can then reboot successfully into your default display (to try different settings from the menu again, if you wish).

Uninstall Google Earth

To uninstall run the *uninstall* shell script located in the /home/*user*/google-earth folder (or whichever folder you installed google-earth into).

GPS

Tux Mobil (http://tuxmobil.org/linux_gps_navigation_applications.html) has a list of Linux applications for use with GPS devices, and compatible hardware. Two GPS packages are

available from the Ubuntu/Kubuntu respositories:

- Viking (http://viking.sourceforge.net/mediawiki/index.php/Main_Page) is a free open source package to view GPS data in maps, and to plot co-ordinates. This has been reviewed (http://www.fsckin.com/2008/04/06/review-four-linux-gps-packages/) as the best Linux GPS mapping program.

```
sudo apt-get install viking
```

- GPS Drive (http://www.gpsdrive.de/) is a free navigation software package that displays your position on a zoomable map using your GPS device. It is GTK-based but can be used in Kubuntu. It uses the gpsd (http://gpsd.berlios.de/) daemon that interfaces with a variety of GPS hardware (http://gpsd.berlios.de/hardware.html) . A .deb package (http://www.gpsdrive.de/download.shtml) of the current version is also available from the website. Install:

```
sudo apt-get install gpsdrive
```

- tangoGPS (http://www.tangogps.org) is a beautiful, lightweight GPS mapping program that uses map data from the Openstreetmap (http://www.openstreetmap.org/) project. Is is a GPL-licensed open source project. A .deb package can be found here (http://www.tangogps.org/gps/cat/Download) .

Celestial (Star) Maps

Celestia

Celestia (http://www.shatters.net/celestia/) is a free planetarium and space simulator for the desktop. Install:

```
sudo apt-get install celestia
```

Stellarium

Stellarium (http://www.stellarium.org/) is an astounding planetarium for the desktop. Install:

```
sudo apt-get install stellarium
```

Science, Technology, and Engineering Applications

What .. you thought (K)Ubuntu was just for play? Also see Ubuntu Science

(https://help.ubuntu.com/community/OtherSoftware) .

Health applications

OpenEMR (Electronic Health Record)

OpenEMR (http://www.open-emr.org/) is a mature, robust, outpatient-setting electronic medical record system that is certified in the US.

- Make sure the LAMP (Linux, Apache, MySQL, PHP5) stack is installed first:

```
sudo apt-get install tasksel
sudo tasksel install lamp-server
```

- Install the Debian/(K)Ubuntu package from this location (http://open-emr.org/wiki/index.php/OpenEMR_Downloads#Ubuntu.2Fdebian) using these instructions (http://open-emr.org/wiki/index.php/OpenEMR_4.1_Ubuntu-Debian_Package_Installation) .

VistA (Enterprise Electronic Health Record)

OpenVistA (http://www.medsphere.com/) and WorldVistA (http://worldvista.org) are two varieties of the largest and most robust CCHIT-approved electronic health record platform in the public domain. They are GPL licensed, are based on the US Veterans Administration health record system, and can be installed as an integrated database, server, and client system. See the detailed download and installation instructions for OpenVistA and WorldVistA, or visit Vistapedia (http://www.vistapedia.net) for other instructions. Also see the Ultimate Server with OpenVistA EHR.

Other systems

- NOSH Charting System / EMR (http://noshemr.wordpress.com) is a free, open-source EMR project in development that can be installed in (K)Ubuntu from a private repository found here (https://launchpad.net/~shihjay2/+archive/nosh-chartingsystem) .

CAD

- QCAD (http://www.ribbonsoft.com/qcad.html) is a free (GPLv3-licensed for versions >3.1), open source 2D-CAD system similar to AutoCAD. Install:

```
sudo apt-get install qcad
```

- LibreCAD (http://librecad.org/cms/home.html) is a Qt-based free (GPLv2-licensed), open source 2D-CAD system which is a fork of QCAD 2.0. Install:

```
sudo apt-get librecad
```

- KiCad (http://www.kicad-pcb.org/) is an open source software suite for electronic design

automation (EDA), facilitating the design of schematics for electronic circuits and their conversion to PCBs (printed circuit board) design. Install:

```
sudo apt-get install kicad
```

- DraftSight (http://www.3ds.com/products-services/draftsight/overview/) is a proprietary 2D-CAD system (like AutoCAD) with a free, limited version available for multiple platforms (including Linux).
- VariCAD (http://www.varicad.com/) is a commercial 3D-CAD package for multiple platforms (including Linux). There is no open source or community version.

Mathematical solutions

Scilab (http://www.scilab.org/) , Octave, and Freemat are three open source solutions for solving complex numerical mathematical problems. Symbolic mathematical problems can be solved with Maxima and Mathomatic. All of these programs are included in the Ubuntu Universe repositories.

Octave

Gnu Octave (http://www.gnu.org/software/octave/about.html) is a free, open source (GPL licensed) platform for solving linear and non-linear equations, similar to (and mostly compatible with) Matlab. It interfaces well with Gnuplot (http://www.gnuplot.info/) . For troubleshooting tips, see this thread (http://ubuntuforums.org/showthread.php?t=1034174) . Install:

```
sudo apt-get install octave3.0
```

Also recommended:

```
sudo apt-get install libatlas3gf-base gnuplot qtoctave
```

Note: QTOctave (https://forja.rediris.es/frs/?group_id=60&release_id=299) is a GUI for Gnuplot or Easyplot 1.1, and and the ATLAS library is an algebra-software-optimization set of utilities.

EasyPlot 1.1 (http://www.amion.com/ep/eplot.html) is an alternative to GnuPlot, with a version (https://forja.rediris.es/frs/?group_id=60&release_id=299) that can be used with QTOctave. It must be installed from source.

An older GUI for Octave/Gnuplot is qgfe (http://www.xm1math.net/qgfe/) (available as the package qgfe).

Freemat

Freemat (http://freemat.sourceforge.net/) is a free, open source (GPL licensed) platform for solving linear and non-linear equations, similar to (and mostly compatible with) Matlab. Install from Add/Remove Programs (Edutainment) or

```
sudo apt-get install freemat
```

Maxima

Maxima (http://wxmaxima.sourceforge.net/) is a free, open source (GPL licensed) computer algebra system (CAS) for doing symbolic mathematics. It can solve equations with many variables, simplify expressions, do calculus, and many other advanced operations. To install:

```
sudo apt-get install wxmaxima
```

To run, enter:

```
maxima
```

or select wxMaxima from the Applications/Science menu. wxMaxima is the standard Maxima GUI.

Mathomatic

Mathomatic (http://www.mathomatic.org) is a free, open source (LGPL licensed) command-line computer algebra system for doing calculations and symbolic mathematics. It can automatically solve and simplify algebraic equations, do some calculus, and other simple but useful operations. To install:

```
sudo apt-get install mathomatic mathomatic-primes
```

To run, enter:

```
mathomatic
```

or select it from the Applications/Science menu.

Amateur Radio applications

Fldigi (http://www.w1hkj.com/Fldigi.html) is a free, open-source (GPL) application for digital-mode amateur radio communications using a sound card. Enable "Community Maintained Software (universe)" in Software Sources; then install either from Add/Remove Programs under (Amateur Radio) or by typing

```
sudo apt-get install fldigi
```

Amateur Electronics

Arduino

Arduino (http://www.arduino.cc/) is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, and hobbyists interested in creating interactive objects or environments. See this tutorial (http://www.codetorment.com/2009/11/02/tutorial-getting-started-with-arduino-ide-on-linux-ubuntu-9-10/) .

Improv

Improv (http://aseigo.blogspot.com/2013/11/introducing-improv.html) is a development-oriented open-hardware computer board useful for prototyping and creating small, powerful devices (that run open source software, ideally).

Raspberry Pi

The Raspberry Pi (http://www.raspberrypi.org/faqs) is a credit-card sized computer that can be plugged into a TV and a keyboard, useful for electronics projects, programming, and many computing tasks.

CuBox

The CuBox (http://www.solid-run.com/mw/index.php?title=Main_Page) is a full-featured miniature computer useful for programming projects and many computer tasks.

Robotics

See this Techsource overview (http://www.junauza.com/2011/10/robotics-software-for-linux.html) of robotics-oriented applications for Linux.

LaTeX

LaTeX (http://www.latex-project.org/) is a LaTeX is a free high-quality typesetting system for the production of technical and scientific documentation.

LyX

LyX (http://www.lyx.org/) is a WYSIWYG frontend and GUI interface useful in creating documents formatted for LaTeX. Install:

```
sudo apt-get install lyx
```

Texmaker

Texmaker (http://www.xm1math.net/texmaker/) is a highly-configurable, Qt-based free application for the creation and editing of LaTeX (http://en.wikipedia.org/wiki/LaTeX) -formatted technical and scientific documents. Install:

```
sudo apt-get install texmaker
```

LaTeX Reference Managers

- The standard LaTeX bibliography (BibTeX) tool can be manipulated with one of several tools:
    - nbibtex. Install:

```
sudo apt-get install nbibtex
```

    - jabref. Install:

```
sudo apt-get install jabref
```

    - biblatex. Install:

```
sudo apt-get install biblatex
```

    - kbibtex (for KDE). Install:

```
sudo apt-get install kbibtex
```

- Zotero (http://www.zotero.org) is a Firefox plugin that allows culling references (and reference content) from online references.

Engineering-oriented applications

CAELinux (http://www.caelinux.com/CMS/) is an engineering-oriented Linux OS (with an the (X)Ubuntu desktop) that comes with a pre-installed set of engineering-oriented applications that can also be installed individually in Ubuntu/Kubuntu:

- CAD/CAM & 3D printing:
    - Freecad (http://freecadweb.org/) (*sudo apt-get install freecad*)
    - OpenSCAD (http://www.openscad.org/) (*sudo apt-get install openscad*)
    - LibreCad (http://librecad.org/cms/home.html) (*sudo apt-get install librecad*)
    - Pycam (http://pycam.sourceforge.net/)
    - OpenSCAM (http://openscam.com/)
    - GCAM
    - dxf2gcode (http://sourceforge.net/projects/dxf2gcode/)
    - Cura 3-D printing (http://www.ultimaker.com/pages/our-software)
- FEA, CFD, & multiphysic simulation:
    - Code-Aster (http://www.code-aster.org/) (*sudo apt-get install code-aster-run code-aster-gui*)
    - Code-Saturne (http://code-saturne.org/cms/) (*sudo apt-get install code-saturne*)
    - OpenFOAM (http://openfoam.org/) (see installation instructions

(http://openfoam.org/download/ubuntu.php))
    - Elmer FEM (http://www.csc.fi/elmer) (*sudo apt-get install elmer*)
    - CalculiX (http://www.calculix.de/)
    - Impact FEM (http://www.impact-fem.org/intro_install_en)
    - MBDyn (http://www.mbdyn.org/)

- Meshing, pre-post, & visualization:

    - Paraview (http://paraview.org/) (*sudo apt-get install paraview*)
    - Discretizer (http://www.discretizer.org)
    - EnGrid (http://engits.eu/en/engrid) (see installation instructions (https://github.com/enGits/engrid/wiki/%5BenGrid-1.4%5D-Installation#Ubuntu_via_CAE_Teams_PPA))
    - Netgen (http://sourceforge.net/projects/netgen-mesher/) (*sudo apt-get install netgen*)
    - Tetgen (http://tetgen.org/) (*sudo apt-get install tetgen*)
    - CGX (http://download.cnet.com/windows/ctv15/3260-20_4-10013936.html)
    - GMSH (http://geuz.org/gmsh/) (*sudo apt-get install gmsh*)
    - Salome (http://www.salome-platform.org/) (see downloads (http://www.salome-platform.org/downloads/current-version))
    - Meshlab (http://meshlab.sourceforge.net/) (*sudo apt-get install meshlab*)

- Electronic design and prototyping:

    - GEDA suite (http://www.geda-project.org/) (*sudo apt-get install geda*)
    - KiCad (*sudo apt-get install kicad*)
    - Fritzing (http://www.fritzing.org/) (*sudo apt-get install fritzing*)
    - Arduino
    - dxf2gcode (http://sourceforge.net/projects/dxf2gcode/) / cadpy (http://sourceforge.net/projects/cadpy/) for PCB isolation milling

- Scientific & development tools:

    - GNU Octave (+ QtOctave GUI)
    - R (http://www.r-project.org/) & Rkward (http://sourceforge.net/apps/mediawiki/rkward) (*sudo apt-get install r-base rkward*)
    - Scilab
    - wxMaxima
    - Spyder IDE & Scipy (http://www.scipy.org/) (*sudo apt-get install python-scipy python3-scipy*)
    - Qt Creator (*sudo apt-get install qtcreator*)
    - gcc, gfortran, g++, python, perl, tcl/tk, ruby compilers

- Scientific writing and office tools:

    - LaTeX, Texmaker, Lyx, LibreOffice, Gimp, Inkscape, Jabref

Miscellaneous software (not endorsed by this

guide)

JBidwatcher

JBidwatcher (http://www.jbidwatcher.com) is a Java-based application allowing you to monitor auctions, submit bids, snipe (bid at the last moment), and otherwise track your auction-site experience. See the website for more details.

Utilities

Utilities facilitate everyday tasks, such as keeping the clock up to date, archiving utilities, and more.

Archiving Utilities

ZIP

The command-line terminal utility ZIP (http://linux.die.net/man/1/zip) creates files that are compatible with the time-honored PKZIP and WinZip. It is included in (K)Ubuntu by default. Extracting zip files can be done with the unzip utility. Using the -P option allows the creation of a password for the zip file:

```
zip -r -P mypassword destination.zip *
```

Note: The -r option indicates to include all subdirectories recursively. The wildcard * adds all files in the directory, but you can specify individual filenames as well. If special characters are to be used in the password, designate them with a preceding \. For example, if the password is to be *notsosecure123#* then the command should be

```
zip -r -P notsosecure123\# destination.zip *
```

For more info, enter in the command-line terminal:

```
man zip
```

File Roller (Archiving GUI)

File Roller (http://fileroller.sourceforge.net/features.html) is a GUI for many types of archival utilities.

X-archiver (Archiving GUI)

Xarchiver (http://xarchiver.sourceforge.net/) is a GTK-based GUI front-end for many archiving utilities. Install:

```
sudo apt-get install xarchiver
```

BChunk

BChunk is a command-line utility that allows you to convert .cue and .bin files into an .iso file (so that they can be opened and manipulated in Ubuntu). **Warning: If the bin/cue image has audio tracks, they will be lost.**

Get BChunk

```
sudo apt-get install bchunk
```

To convert .cue and .bin files, navigate to the folder and run this command (replacing filenames with your own):

```
bchunk inputfilename.bin inputfilename.cue outputfilename.iso
```

After the file is converted into ISO you can mount it using:

```
sudo mount -o loop outputfilename.iso /media/output
```

Navigate to /media/output and you should see all the content there. You can then copy it anywhere.

To unmount:

```
sudo umount /media/output
```

HJSplit Files Joiner/Splitter

HJSplit for Linux (Java version).

- Make sure you have Java Runtime Environment installed:

```
sudo apt-get install sun-java6-jre
```

- Download the HJSplit JAR file:

```
wget http://www.freebyte.com/download/hjsplit/hjsplit_g.jar
```

- Create the directory for HJSplit:

```
sudo mkdir /opt/hjsplit
```

- Move the file to an appropriate directory:

```
sudo mv hjsplit_g.jar /opt/hjsplit/
```

- Run:

```
cd /opt/hjsplit/ && java -jar hjsplit_g.jar
```

Note: You could also make a terminal shortcut (menu item) in K Menu Editor.

Rar

Rar archives files into the proprietary .rar format.

```
sudo apt-get install rar
```

This application is a 40-day trial.

Unrar

Unrar extracts files archived with the proprietary .rar format. A free version can be installed:

```
sudo apt-get install unrar-free
```

or the proprietary version (also free for noncommercial use) can be installed with the ubuntu-restricted-extras package or with:

```
sudo apt-get install unrar
```

7-Zip

The open-source 7-Zip archive format was originally designed for Windows (and DOS) but is also available for Ubuntu. The GNU/Linux version of 7-Zip does not come with a GUI, but Ark can hook into 7-Zip to handle 7z archives. Install:

```
sudo apt-get install p7zip-full
```

To allow the 7-Zip extension for Ark to extract .rar files, also install:

```
sudo apt-get install p7zip-rar
```

Hard Drive Utilities

KDiskFree (Hard drive properties monitor)

KDiskFree (http://docs.kde.org/stable/en/kdeutils/kdf/using-kdf.html) is a KDE utility for monitoring free disk space, etc.

```
sudo apt-get install kdf
```

Clock Utilties

Screensavers

A screensaver is useful as a security precaution as well as a power and screen element saver. Using even a simple "Blank Screen" screensaver with a password can slow a potentially malicious passerby from gaining access to your keyboard and computer while you are away from your desk.

Menu -> System -> Preferences -> Screen Saver

- Set a security password:

  Screen Saver -> Lock screen when screensaver is active (*ticked*)

Partition Managers

Also see these tips for partitioning scheme suggestions, other partitioning tools and methods, and usage of multiple partitions for multiple OSs.

GParted Partition Manager

Gparted (http://gparted.sourceforge.net/) is a GTK (Gnome)-based partition manager that can also be used with KDE.

- This utility works best when run from a LiveCD. The newest versions of the GParted LiveCD (http://gparted.org/livecd.php) are UEFI-compatible.
- Recent versions of the Ubuntu LiveCD have a copy of GParted on them. Start the Ubuntu LiveCD in demo mode (not in install mode) and then start GParted:

  Menu -> System -> Administration -> GParted
- An alternative is to download the Gparted .iso image here (http://sourceforge.net/project/showfiles.php?group_id=115843&package_id=271779) . Follow these instructions (https://help.ubuntu.com/community/BurningIsoHowto) to burn this .iso image to CD. Use this GParted LiveCD as your partition manager.
- You can also install the package into your OS (once it is installed on your hard drive):

```
sudo apt-get install gparted
```

System Backup and Recovery

Rsync

Rsync (http://rsync.samba.org/) is the directory backup and transfer tool for Linux. It is installed by default in Ubuntu. It can provide any type of backup, and options are extensive. Several GUI frontends for Rsync are listed here (http://www.debianhelp.co.uk/rsyncweb.htm) .

GRsync

GRsync (http://www.opbyte.it/grsync/) is a GTK-based GUI front-end for Rsync. Install:

```
sudo apt-get install grsync
```

Bacula

Bacula (http://www.bacula.org/) is the most widely-used GTK-based open source (GPL-licensed) network backup utility that is used in both server and desktop installations. A catalogue of backups can be maintained using MySQL, PostgreSQL, or SQLite. For more info see the Ubuntu documentation (http://doc.ubuntu.com/ubuntu/serverguide/C/bacula.html) . Both text-based and GUI frontends are available. Install the MySQL version:

```
sudo apt-get install bacula
```

SBackup

SBackup (http://sourceforge.net/projects/sbackup/develop) is a simple backup and restore utility for the GTK-desktop. Install:

```
sudo apt-get install sbackup
```

Keep (Backup and Recovery)

Keep (http://jr.falleri.free.fr/keep/wiki/Home) is a QT/KDE based backup utility used in previous versions of Ubuntu. It is no longer maintained and is not included in Ubuntu by default. Install:

```
sudo apt-get install keep
```

Run:

- Menu -> Applications -> System Tools -> Keep (Backup System)
    - Backup:
      Click "Add a Directory to Backup"
      Select directories you wish to backup

Select a location to place the backup
Set how often you wish the backups to take place, and how long to keep them
Click "Backup Now"
Select the directory groups you wish to backup.

- Recover:
  Click "Restore a Backup"
  Select the directory groups you wish to restore.

Partimage (Partition backup)

Partimage (http://sourceforge.net/projects/partimage/) is a free open-source utility to back up an entire partition into an .iso image. It can be used across a network, as well. Install and run:

```
sudo apt-get install partimage
sudo partimage
```

Partimage cannot be used from within the partition you wish to backup. You will either have to run it from a different partition or from a LiveCD that contains it. (A serious limitation of Partimage is its inability to backup/restore split image files to/from multiple media (e.g. spanned DVDs/CDs), limiting its usefulness as an inexpensive cloning and distribution solution. Partition image backup/restoration must be to/from a single hard drive, large capacity USB stick, or networked storage space.)

cp

An entire partition's filesystem can easily be copied to another partition using the *cp -a* command. (However, this cannot be done for the partition of a filesystem that is running. Use the (K)Ubuntu LiveCD to copy partitions when necessary.) Obviously the destination partition should be as large or larger than the source partition, and while not necessary, probably is best if both partitions are of the same filesystem type (e.g. ext4). Use GParted to create or manipulate the destination partition, if necessary. To copy the entire filesystem, for example, from the ext4 partition */dev/sda6* into the ext4 partition at */dev/sda7*, mount both partitions:

```
sudo mkdir /media/partsda6
sudo mkdir /media/partsda7
sudo mount /dev/sda6 -t ext4 /media/partsda6
sudo mount /dev/sda7 -t ext4 /media/partsda7
```

Then merely copy the contents from one partition to the other:

```
sudo cp -a /media/partsda6/* /media/partsda7
```

- Of course, once the partition's filesystem is copied, a bootmanager (Grub2 or Grub Legacy) will have to be updated/reconfigured to recognize the new partition's OS in order to enable it to boot. Also, the /etc/fstab file of the new partition's filesystem may need to be edited (in regards to the UUIDs of the various partitions), to prevent conflicts. To determine the UUIDs of all current partitions on a hard drive:

```
sudo blkid
```

Edit fstab so that the UUIDs are correctly reflected there.

- To confirm that the file copy has completed, the Linux command du (http://www.gnu.org/software/coreutils/manual/html_node/du-invocation.html) (also see these tips (http://www.codecoffee.com/tipsforlinux/articles/22.html)) can be used to calculate the disk usage for both the source and destination folders in order to compare the values (to ensure that they are the same). For example, the values should be the same for both partitions after copying has completed:

```
sudo du /media/partsda6
sudo du /media/partsda7
```

dd

dd (http://en.wikipedia.org/wiki/Dd_%28Unix%29) is a *nix command that enables the copying of files or an entire disk using a single command. Parameters must be precisely specified to avoid risk of accidentally erasing data. See these brief instructions (http://www.gnu.org/software/coreutils/manual/html_node/dd-invocation.html) or these instructions (http://www.opengroup.org/onlinepubs/9699919799/utilities/dd.html) for detailed options. You cannot copy a hard drive that contains the operating system you are currently running. Instead, boot into a LiveCD and run the dd command that way. An example command to copy Hard drive X to Hard drive Y is:

```
dd if=/dev/hdx of=/dev/hdy
```

- ddrescue (http://www.garloff.de/kurt/linux/ddrescue/) is a variation of the dd command that allows working with potentially corrupted datasets, partitions, or hard drives.

FSArchiver (Filesystem Archiver)

FSArchiver (http://www.fsarchiver.org/) is a utility to backup the filesystem by files (instead of by partition blocks). A filesystem backed up in this way can be moved to a different sized partition or another disk filesystem altogether (e.g. from ext3 to ext4). Backups can be split and stored on (and restored from) spanned media (e.g. multiple DVDs/CDs). It is included in the System Rescue CD. Install:

```
sudo apt-get install fsarchiver
```

System Rescue and Cloning Utilities

System Rescue CD

SystemRescueCD (http://www.sysresccd.org/Main_Page) is a LiveCD that includes important

utilities such as GParted, Partimage, ddrescue, Rsync, and FSArchiver. Several of these utilities cannot be used from within a running partition, so using them from a LiveCD is often necessary. Download (http://www.sysresccd.org/Download) and burn (https://help.ubuntu.com/community/BurningIsoHowto) the LiveCD from the website.

Clonezilla

Clonezilla (http://clonezilla.org/) allows the backup or duplication of a partition for a single machine or for multiple machines over a network. (It is similar to Norton Ghost.) It includes Partimage, partclone (http://sourceforge.net/projects/partclone/) , and other utilities. It is available (http://sourceforge.net/projects/clonezilla/files/) as a LiveCD which can then be burned (https://help.ubuntu.com/community/BurningIsoHowto) . (A serious limitation of Clonezilla is its inability to backup/restore split image files to/from multiple media (e.g. spanned DVDs/CDs), limiting its usefulness as an inexpensive cloning and distribution solution. Partition image backup/restoration must be to/from a single hard drive, large capacity USB stick, or networked storage space.)

Disk Imaging software

- G4U (http://sourceforge.net/projects/g4u/) is a utility to image a disk bit by bit.
- G4L (http://sourceforge.net/projects/g4l/) is a utility to image a disk bit by bit. It includes a GUI interface.

Ubuntu Customization Kit

- Ubuntu Customization Kit (http://sourceforge.net/projects/uck) is a utility to customize a (K)Ubuntu LiveCD. Install:

```
sudo apt-get install uck
```

Remastering software

Debian and (K)Ubuntu Linux operating systems can be "remastered" and customized (using one of a number of utilities) for re-distribution. (See this Wikipedia list (http://en.wikipedia.org/wiki/List_of_remastering_software) .) This enables an organization to pre-load desired applications and customizations for distribution among its members, while preserving the intrinsic architecture and function of (K)Ubuntu. The customized (K)Ubuntu OS can then be distributed on a CD or on a USB flashdrive. Users are then free to further customize the OS, or even to revert back to the original default (K)Ubuntu settings. Also see the Ubuntu wiki (https://help.ubuntu.com/community/InstallCDCustomization) .

- oem-config-gtk

```
sudo apt-get install oem-config-gtk
```

- Remastersys for Ubuntu (http://sourceforge.net/projects/remastersys/) . For tips, see this page.
- Reconstructor (https://www.reconstructor.org/projects/reconstructor/wiki/UserGuide) . The

open source engine can be downloaded (https://www.reconstructor.org/projects/reconstructor/files) and installed as a .deb package.

Run (K)Ubuntu LiveCD from a USB pendrive

The (K)Ubuntu LiveCD can be installed on and run from a USB pendrive. Settings can be "persistently" saved (but the LiveCD kernel modules can not be upgraded). Programs can be installed and run, however, and files saved to the USB drive. (The installed programs will remain installed). A (K)Ubuntu Live CD is needed to do the installation. For additional info, see the Ubuntu Official documentation (http://www.ubuntu.com/download/help/create-a-usb-stick-on-ubuntu) , the Ubuntu Community documentation (https://help.ubuntu.com/community/Installation/FromUSBStick) or the Pendrivelinux instructions (http://www.pendrivelinux.com/creating-an-ubuntu-live-usb-from-cd/) .

The USB "LiveCD" can be used to install (K)Ubuntu on computers (including netbooks) that do not have CD-ROM/DVD drives. See these instructions to boot from a USB flashdrive.

USB pendrives to be used to run (K)Ubuntu should have a minimum of 2 Gb (preferably 4 Gb). If you wish to install a fast, fully functional Linux system on a pendrive that has less memory than that, use PuppyLinux (http://www.puppylinux.org/) or Lubuntu (https://wiki.ubuntu.com/Lubuntu) .

USB Creator

You can make a "LiveCD" on a USB pendrive using USB Creator and either a LiveCD or an .iso version of the LiveCD stored on your hard drive. USB Creator is installed by default in (K)Ubuntu. If not, install:

```
sudo apt-get install usb-creator-gtk
```

- Run:

  Menu -> System -> Startup Disk Creator

Create a boot CD to allow booting from the USB drive

Many computers do not allow booting from a USB drive (but they do allow booting from the CD-ROM). You can create a CD-ROM using these Pendrivelinux instructions (http://www.pendrivelinux.com/make-a-usb-boot-cd-for-ubuntu-11-10/) and set your BIOS to boot from this CD-ROM. When you boot from this CD-ROM, it will use the bootup files on the (K)Ubuntu USB drive you previously created (in the step above).

User Administration

Users and Groups

- *Note: The Unity user interface does not currently have a GUI method to modify user and*

group settings. For an introduction to managing users and groups from the CLI (command-line interface) see the Ubuntu Server Guide (https://help.ubuntu.com/12.04/serverguide/user-management.html) and this brief tutorial (http://basicconfig.com/linux/grpadd) .

Manage Users and Groups with the Gnome2 GUI

- Gnome2 (the user interface for older versions of Ubuntu) included a GUI for managing users and groups. That Users and Group Management Tool from Gnome2 can be installed as part of Gnome System Tools:

```
sudo apt-get install gnome-system-tools
```

You can then launch it from Unity Dash, by pressing ALT+F2, or by creating a menu item with the command:

```
users-admin
```

- Change user and group settings

  Menu -> System -> Administration -> Users and Groups

- Add New Users

  Menu -> System -> Administration -> Users and Groups -> Add

- Remove Users

  Menu -> System -> Administration -> Users and Groups -> *user* -> Delete

- Modify Users

  Menu -> System -> Administration -> Users and Groups -> *user* -> Advanced Settings
  or
  Menu -> System -> Administration -> Users and Groups -> *user* -> Manage Groups

It is quite often necessary to have extra privileges to do certain tasks. These privileges are assigned to your user by belonging to certain groups. The tasks are allowed to be performed by any user belonging to the group associated with that task.

Example: a "sudoer" is a user who can perform certain administrative tasks, such as updating the system. To become a "sudoer" a user must belong to the "sudo" group.

Menu -> System -> Administration -> Users and Groups -> *user* -> Manage Groups --> *sudo* -> Properties -> Group Members -> *user* (*ticked*)

To become an administrator, you must belong to the adm, admin, and sudo groups. To be a virtualbox user, you must belong to the virtualbox group. To change printer settings you must belong to lpadmin. To use the cdrom, you must belong to cdrom. To use hot-pluggable devices,

you must belong to plugdev. To share Samba folders (on a Windows-based network), you must belong to sambashare. To access NTFS files using the virtual filesystem fuse, you must belong to the fuse group. To use many games, you must belong to the games group. The list is long, and not always obvious.

Unfortunately, while this is the feature that gives Linux such a high-level of security, it can also take diligence to remember to add your user to certain groups. It is not uncommon for programs and functions on your system not to work merely because you don't have privileges to do so because you forgot to add your user to the appropriate group(s).

Of most importance, you must already be an administrator in order to change membership in groups. Therefore, if you create a new user and intend to give that user administrative privileges (by assigning the user to the administrative groups), you must do so from your original administrator account (the one you set up at installation) or from another administrative user account.

Timekpr (Parental controls)

Timekpr (http://launchpad.net/timekpr) is a program to track and control the computer usage of user accounts. It is available from a Launchpad PPA (http://launchpad.net/~timekpr-maintainers/+archive/ppa) .

- If updating, remove any prior versions:

```
sudo dpkg --purge timekpr
```

- Add the timekpr third-party repositories:

```
deb deb http://ppa.launchpad.net/timekpr-maintainers/ppa/ubuntu oneiric main
deb-src deb http://ppa.launchpad.net/timekpr-maintainers/ppa/ubuntu oneiric main
```

- Install:

```
sudo apt-get install timekpr
```

  When prompted which default display manager to use, select "kdm"

- Start:

  K menu -> System -> Timekpr Control Panel

Web content filtering

DansGuardian (http://dansguardian.org/) provides web filtering capability, similar to NetNanny. It is useful for limiting objectionable content in publicly accessible workstations, or for filtering objectionable content for younger users. It integrates with ClamAV, and uses several criteria for filtering websites (which is difficult to modify). It is used with Tinyproxy (https://www.banu.com/tinyproxy/) (best for individual users) or the Squid (http://www.squid-cache.org/) proxy (best for a network server). Install:

```
sudo apt-get install dansguardian tinyproxy
```

or

```
sudo apt-get install dansguardian squid
```

See these installation instructions (https://help.ubuntu.com/community/Servers/DansGuardian) for setup details. In brief,

- Edit the dansguardian configuration file:

```
sudo nano /etc/dansguardian/dansguardian.conf
```

comment out the UNCONFIGURED line:

```
#UNCONFIGURED
```

If using tinyproxy instead of Squid, change the proxyport to 8888:

```
proxyport 8888
```

- Reinstall dansguardian:

```
sudo apt-get install --reinstall dansguardian
```

- Set your browser to use the localhost:8080 proxy. For example, in Firefox:
  - Firefox -> Edit -> Preferences -> Advanced -> Network -> Settings
  - Manual proxy configuration -> HTTP proxy: localhost -> Port: 8080
- A Webmin module (http://sourceforge.net/projects/dgwebminmodule) is available to administer settings. Also, a GUI (http://ubuntuforums.org/showthread.php?t=207008&page=8) to change Dansguardian settings called Webstrict (http://www.ubuntume.com/webstrict) is in development.
- A GUI for use with IPCop (http://www.dageek.co.uk/ipcop/addonz/dansgui.htm) (based on the webmin module) is also available.

System Administration

Automating Tasks

- Cron is a system daemon that runs tasks in the background according to instructions found in a crontab file. To edit the crontab file for the current user:

```
crontab -e
```

Tasks that normally require administrative (sudo) privileges should be added to the root user's crontab:

```
sudo crontab -e
```

Add commands using the format specified here (http://pubs.opengroup.org/onlinepubs/9699919799/utilities/crontab.html) (or see the Ubuntu Community Help (https://help.ubuntu.com/community/CronHowto)). The crontab command format can also be found using:

```
man crontab
```

- Scheduled/automated tasks (cron events) can also be edited using the GNOME schedule (http://gnome-schedule.sourceforge.net/) GUI interface.

  Menu -> System -> Administration -> Task Scheduler

- If the GNOME Schedule task scheduler is not installed, install it:

```
sudo apt-get install gnome-schedule
```

Boot Menu

Login Menu settings

You can change the Login menu settings from the GUI interface:

Menu -> System -> Administration -> Login Manager

You can choose an integrated theme or select individual components of the login screen/process.

Automating bootup options

StartupManager is a GUI to manage settings for Grub (Grub Legacy), Grub 2, Usplash, and Splashy.

GRUB boot manager settings

Grub2

Precise comes with Grub2 (http://www.gnu.org/software/grub/manual/grub.html) , a difficult boot manager to customize. (Grub2 is also known as grub-pc.) See the evolving instructions at the Ubuntu wiki (https://wiki.ubuntu.com/Grub2) or Ubuntu forums (http://ubuntuforums.org/showthread.php?t=1195275) . In brief, some settings can be edited:

```
sudo nano /etc/default/grub
sudo grub-mkconfig --output=/boot/grub/grub.cfg
```

Alternatively, use the command:

```
sudo update-grub
```

Grub2 background image, colors, fonts

- See this Ubuntu Forums thread (http://ubuntuforums.org /showthread.php?p=10720685#post10720685) .
- Any background image can be used for Grub2 by placing the image in the /boot/grub folder and then reconfiguring Grub2:

```
sudo update-grub
```

The image ought to be the same size as the Grub2 startup resolution specified in /etc/default/grub (e.g. 1024x768).

- A selection of splashimages can be installed into the /usr/share/images/grub folder:

```
sudo apt-get install grub2-splashimages
```

    - One of the images can be linked to the /boot/grub folder and used as the splash image. For example:

```
sudo ln -s /usr/share/images/grub/Plasma-lamp.tga /boot/grub
sudo update-grub
```

Change the default menu item

- There are several ways to change the default Grub2 (https://help.ubuntu.com/community /Grub2#A.2BAC8-etc.2BAC8-grub.d.2BAC8_.28directory.29) menu item, but only one is reliable. The menu items in Grub2 change name and position in the list with every kernel upgrade. However, if you choose the default menu item by name, you can reliably set it as the default. For example, if you wish to boot a Windows OS as the default and the Grub 2 menu lists it as *Microsoft Windows 98SE Ancient Edition (on /dev/sda1)* then edit /etc/default /grub:

```
sudo kate /etc/default/grub
```

and change the entry to resemble:

```
GRUB_DEFAULT="Microsoft Windows 98SE Ancient Edition (on /dev/sda1)"
```

then regenerate the Grub2 config file:

```
sudo update-grub
```

To find out the names of the menu items, use:

```
sudo grep menuentry /boot/grub/grub.cfg
```

- Note: There is a bug in Grub2 v.1.99 such that if the GRUB_DEFAULT option is used, the Grub2 menu can not be entered (for manually selecting a menu item). If the default option is a non-Linux OS, there will then be no way start a Linux OS (and therefore no way to subsequently change the /etc/default/grub configuration file). Use this option with great care.

Protecting Grub2 from cracking

- See this section of the Grub Manual (http://www.gnu.org/software/grub/manual/grub.html#Security) for important information on securing Grub2.
- To add password protection, in the /etc/grub.d/40_custom configuration file, add the lines:

```
set superusers="user1"
#password_pbkdf2 user1 grub.pbkdf2.sha512.10000.biglongstring
password user1 insecurecleartextpassword
```

and change your password to something other than *insecurecleartextpassword*, or use the pbkdf2-encrypted method described here (http://www.gnu.org/software/grub/manual/grub.html#Security) . You can then password-lock menu items as well. For detailed info see this blog (http://www.panoet.com/set-grub-2-password-protection-149) .

GRUB Legacy

The older version of GRUB ("Grub Legacy (http://www.gnu.org/software/grub/manual/legacy/grub.html) ") is available, for use with a boot partition, for example. Install:

```
sudo apt-get install grub
```

- If you have multiple operating systems (OS) on your computer, you may be using the GRUB Legacy boot manager (in a boot partition, for example). You can edit the options for GRUB Legacy in the menu.lst configuration file. (See this detailed info.)

```
sudo nano /boot/grub/menu.lst
```

(gedit can also be used instead of nano as the text editor.)

Chainloading Grub2 from Grub Legacy

- To chainload Grub2 (installed in this example with the OS in the */dev/sda7* partition) from Grub Legacy (stored in a boot partition, for example), use an entry of this format in the Grub Legacy /boot/grub/menu.lst configuration file:

```
title           (K)Ubuntu Precise OS (chainloader)
rootnoverify    (hd0,6)
chainloader     +1
```

- Grub2 is erratic, however. In many situations I don't bother to chainload it at all. Instead, it is possible to bypass Grub2 entirely and load the OS directly using Grub Legacy (stored in a boot partition, for example) using an entry in /boot/grub/menu.lst of the format:

```
title           (K)Ubuntu Oneiric OS (chainloader)
rootnoverify    (hd0,6)
kernel          /vmlinuz root=/dev/sda7 ro
initrd          /initrd.img
```

- My old method for chainloading Grub2 (installed in this example in the */dev/sda7* partition) from Grub Legacy used an entry in the Grub Legacy configuration file (/boot/grub/menu.lst) with this format:

```
title           (K)Ubuntu Maverick OS (chainloader)
rootnoverify    (hd0,6)
kernel          /boot/grub/core.img
```

  This method, however, requires a current core.img to have been created with grub-mkimg (part of the grub-install process). When there are substantial changes to the partition or the kernel, the core.img must be re-created by re-installing Grub2 into the OS partition (in this example */dev/sda7* corresponds to *(hd0,6)*):

```
sudo grub-install /dev/sda7
```

Protecting Grub Legacy from cracking

- See this section of the Grub Manual (http://www.gnu.org/software/grub/manual/legacy/grub.html#Security) for important information on securing Grub Legacy.
- To add password protection, in the /boot/grub/menu.lst configuration file, uncomment (remove the hashmark) from the line:

```
#password topsecret
```

and change your password to something other than *topsecret*, or use the md5-encrypted method described here (http://www.gnu.org/software/grub/manual/legacy/grub.html#Security) . You can then password-lock menu items by adding the descriptor *lock* below the title of any item menu.

Default Applications

In previous version of ubuntu, you could choose which program to use as your default program for a specific task.

> Menu -> System -> Administration -> Default Applications

or by *right-clicking* on any file and choosing the "Open with Other Application..." option.

The Default Applications menu has now been removed from Ubuntu, however. For a GUI that will allow this and multiple similar Ubuntu system tweaks, install Ubuntu Tweak (http://ubuntu-tweak.com/) :

```
wget http://launchpad.net/ubuntu-tweak/0.5.x/0.5.8/+download/ubuntu-tweak_0.5.8-1_all.deb
sudo dpkg -i ubuntu-tweak_0.5.8-1_all.deb
```

Kill a process

Sometimes a program (or "process") just freezes. To "kill" (or end) the program/process:

> Menu -> System -> Administration -> System Monitor -> highlight the errant process -> Kill process

From the command line:

```
sudo killall process
```

> where *process* is the name of the frozen program, such as *firefox*.

Enabling NUM LOCK On Startup

> Menu -> System -> Administration -> Keyboard & Mouse -> Keyboard ->"turn on Numlock on Startup"

Working with Menus

Create an encrypted folder

You can create a folder whose contents are encrypted. See these instructions (https://help.ubuntu.com/community/EncryptedPrivateDirectory) .

Create a symlink from a file to another location

A symbolic link (http://en.wikipedia.org/wiki/Symbolic_link) (also known as a symlink) is a method in Linux of referring to a file (or directory) in one location from another location. Usage:

```
ln -s /path/to/source /path/to/destination
```

If */path/to/destination* requires superuser rights, then use:

```
sudo ln -s /path/to/source /path/to/destination
```

This is similar to, but more powerful than, creating Shortcuts, with which former Windows users may be familiar.

Assign a root password

To be able to log in as root directly, you must assign a root password. This can be done with:

```
sudo passwd root
```

Afterwards, you can use

```
su
```

to get a root prompt. You would then use the root password.

Get a root prompt without using a root password

If you have not set a root password (or don't know it), you can obtain root user privileges anyway. From the command-line Terminal:

```
sudo -s
```

or

```
sudo su
```

or

```
sudo bash
```

You will use your own user password instead of a root password.

You could also get a prompt to become any other user on the computer by typing:

```
sudo su <username>
```

Use the File Manager as root

```
sudo nautilus
```

or

```
gksudo nautilus
```

Manually Mount and Unmount a device

To manually mount a device:

```
mount /dev/hda
```

replace /dev/hda with the location of the device.

To manually unmount a device:

```
umount /dev/hda
```

replace /dev/hda with the location of the device.

Windows Compatibility

Mounting NTFS Partitions (with read/write privileges)

Find out the name of your ntfs partition:

```
sudo fdisk -l
```

Method 1: In this example, the NTFS drive is listed by fdisk as /dev/sda2, but yours may differ.

Make a mount point for the drive:

```
sudo mkdir /media/WindowsNTFS
```

Edit fstab:

```
sudo nano /etc/fstab
```

Comment out the automatically added lines by Ubuntu installation:

```
#/dev/sda2  auto nouser,atime,noauto,rw,nodev,noexec,nosuid 0 0
#/dev/sda2 /mnt auto user,atime,noauto,rw,nodev,noexec,nosuid 0 0
```

and instead add the line:

```
/dev/sda2 /media/WindowsNTFS ntfs-3g quiet,defaults,rw 0 0
```

Note: There are many ways to mount the drive, depending on your needs. The fstab (http://en.wikipedia.org/wiki/Fstab) file controls this process. See How to edit and understand

fstab (http://www.tuxfiles.org/linuxhelp/fstab.html) and Intro to using fstab (http://ubuntuforums.org/showthread.php?t=283131) .

In this example, I indicated that the file system was an ntfs-3g filesystem, so did not use the auto option (which detects the filesystem automatically). I used rw to specify read/write privileges for all users, but umask=0 and umask=000 are accepted by some kernels.

Method 2: Edit fstab:

```
sudo nano /etc/fstab
```

When Ubuntu installation finishes, it mounts all ntfs partitions automatically with ntfsprogs, adding a line similar to the following to fstab:

```
UUID=8466268666267956 /media/sda1     ntfs    defaults,gid=46 0       1
```

Change this line to:

```
UUID=8466268666267956 /media/sda1     ntfs-3g    defaults,nls=utf8,locale=zh_CN.UTF-8,rw,gid=46 0       1
```

In this example, I have a Chinese-language Windows installation on my first partition, so I set the locale parameter (locale=zh_CN.UTF-8) so that my Chinese documents can display correctly. Setting rw (same as umask=0 or umask=000) lets me read/write the partition without sudo. gid=46 specifies that the drive will belong to the group of hot-pluggable devices (plugdev) and is not necessary unless your ntfs drive is a hot-pluggable one (such as an external USB drive). nls=utf8 is the default and is optional for most ntfs users, but there are other options for Chinese (and other specialized character-set users).

Mounting FAT32 Partitions

Follow the above instructions, but use vfat instead of ntfs-3g.

In other words, if you have made a mount point directory /mnt/WindowsFAT32 and your FAT32 drive is /dev/sda3, then edit the /etc/fstab file to include the line:

```
/dev/sda3 /mnt/WindowsFAT32 vfat quiet,defaults,rw 0 0
```

Synchronize clock to network time server

The Network Time Protocol (NTP) allows time synchronization of your computer to time servers on the Internet.To enable it:

- Applications menu -> System Settings -> Date & Time
- Check the "Set date and time automatically" option
- Choose an ntp time server near you.

Hardware

CPU and motherboard

The Linux kernel in versions of (K)Ubuntu starting with Karmic Koala implemented mandatory CPU temperature and fan speed sensor monitoring (which was optional in previous kernels). The output from the sensors is used to effect CPU scaling (throttling) in the event of "out of range" temperature values. However, not all motherboards/CPUs have sensor drivers available, and due to a bug in the feedback routine, missing sensors drivers incorrectly report as an "out of range" error in the kernel. Originally this threw multiple errors which were logged (using rsyslogd) to both the /var/log/kern.log and the /var/log/syslog files, filling them to multiple Gb size within a few hours. This had the effect of slowing, then freezing, the machine. (Eventually the machine will simply not boot.)

The workaround involves disabling the ONDEMAND module.

Disable CPU Frequency scaling

This error shows on my system (at boot and in the kernel and system logs) as:

```
powernow-k8: failing targ, change pending bit set
```

My motherboard does not have drivers for my CPU fan sensor. Therefore, the Linux kernel cannot monitor the temperature and fan speeds properly and throttles the CPU (aka frequency scaling) inappropriately. This has the effect of slowing or freezing my computer. To turn off this behavior, I used the Debian RCConf utility:

```
sudo apt-get install rcconf dialog
sudo rcconf
```

and unchecked the ONDEMAND item. (I also unchecked the fan control item). I then rebooted. For more info, see this (http://askubuntu.com/questions/3924/disable-ondemand-cpu-scaling-daemon) .

- An alternative command is:

```
sudo update-rc.d ondemand disable
```

(Note: These instructions may not work with newer Linux kernels.)

libsensors

libsensors (libsensors3 and/or libsensors4) is a module that allows an interface (such as lm-sensors) to monitor your motherboard/CPU temp and fan speeds. You can adjust settings:

```
sudo kate /etc/sensors.conf
```

```
sensors -s
```

libsensors and lm-sensors are not used by the Linux kernel (which uses other routines).

Some hardware CPU sensors are not recognized by the Linux kernel, causing system slowdown or freezing. Here (http://www.lm-sensors.org/wiki/FAQ/Chapter3#Mysensorshavestoppedworkinginkernel2.6.31) is some info about hardware/sensors problems.

Sensors-applet (Motherboard monitoring)

Sensors-applet (or xsensors) is the Gnome (Ubuntu) frontend for lm-sensors. These sensors monitor the temperature and fan-speed sensors of your motherboard.

```
sudo apt-get install sensors-applet lm-sensors
sudo sensors-detect
sensors-applet
```

- Make sure your sensors are installed.

```
sensors
```

For more info, see this thread (http://ubuntuforums.org/showthread.php?t=2780) .

Graphics Cards

Frequency Out of Range / Choose New Resolution

- If this error appears when booting Natty Narwhal or later, see the solution found here at Ubuntu Forums (http://ubuntuforums.org/showthread.php?p=10747748#post10747748) :
  - Edit the grub configuration file:

```
sudo gedit /etc/default/grub
```

  - Edit the lines:

```
# The resolution used on graphical terminal
# note that you can use only modes which your graphic card supports via VBE
# you can see them in real GRUB with the command `vbeinfo'
#GRUB_GFXMODE=640x480
```

    by removing the comment hashmark and choosing an appropriate resolution so that the lines resemble:

```
# The resolution used on graphical terminal
# note that you can use only modes which your graphic card supports via VBE
# you can see them in real GRUB with the command `vbeinfo'
```

```
GRUB_GFXMODE=1024x768
```

- Re-build the grub configuration file:

```
sudo update-grub
```

Install Latest Nvidia/ATI drivers

Ubuntu uses a GUI frontend to Jockey (https://launchpad.net/jockey) for the installation of the proprietary nVidia drivers (and other proprietary drivers).

Menu -> System -> Hardware Drivers

- Sometimes after a kernel upgrade a proprietary driver may stop working. In such a case, try installing the new linux-headers that match the newly upgraded kernel:

```
sudo apt-get install linux-headers-$(uname -r)
```

If dkms and build-essential have never been installed on your system, these can also be worthwhile:

```
sudo apt-get install dkms build-essential
```

Intel integrated graphics cards

- None of my computers with Intel integrated graphics had problems installing Precise. If the screen blanks or freezes at bootup, however, or flashes a "Frequency Out of Range" error several times, these steps may work around this problem. (I found, however, that these changes were NOT necessary and actually provided me with a worse boot up appearance).
- When booting up, choose recovery mode as root (or "root with networking"). This will give the command line (as root user).
- Edit the Grub2 configuration file:

```
sudo nano /etc/default/grub
```

- Make sure a graphics mode is specified (i.e. the relevant line is uncommented), according to these steps, such as:

```
GRUB_GFXMODE=1024x768
```

- Change the line:

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet"
```

to

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet nomodeset"
```

or, alternatively,

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet nouveau.blacklist=1"
```

In previous versions of (K)Ubuntu I used

```
GRUB_CMDLINE_LINUX_DEFAULT="quiet i915.modeset=0"
```

but I don't think this option is required or used any longer.

- Then regenerate the Grub2 configuration file:

```
sudo update-grub
```

or

```
sudo grub-mkconfig --output=/boot/grub/grub.cfg
```

After rebooting, graphics will usually work.

Intel graphics resolution problems

- On a fresh installation of Karmic Koala I had no problems with my onboard Intel graphics card. However, on an update from Jaunty to Karmic, I could not get higher screen resolutions -- the same problem I had in Jaunty. A solution to achieve higher resolutions is to revert to the old Intel drivers (used in Intrepid), as detailed here (https://wiki.ubuntu.com/ReinhardTartler/X/RevertingIntelDriverTo2.4) .

Screen Keeps Flickering

If you have an Intel Corporation Mobile 915GM/GMS/910GML card, your screen may flicker every 5-10 seconds. To prevent this:

- Menu -> System -> Administration -> Advanced -> Service Manager -> Uncheck "Detect RANDR (monitor) changes"

Reconfigure xserver-xorg

```
sudo dpkg-reconfigure xserver-xorg
```

xorg.conf

Before installing any driver for ATI or nvidia, please make backup xorg.conf before following this method.

```
sudo cp /etc/X11/xorg.conf /etc/X11/xorg.conf.bak
```

If you have edited this file but would like it to be automatically updated again, run the following command:

```
sudo dpkg-reconfigure -phigh xserver-xorg
```

If you want to try this xorg.conf after installing the driver, you must back up your xorg.conf as following. And then, edit /etc/X11/xorg.conf in text editor. **Add or modify** this xorg.conf sample.

xorg.conf for nvidia

```
Section "Screen"
Identifier "Default Screen"
Device "Configured Video Device"
Monitor "Configured Monitor"
SubSection "Display"
Depth 16
Modes "1280x1024" "1024x768"
Option "AddARGBGLXVisuals" "True"
EndSubSection

Option "AddARGBGLXVisuals" "True"
Defaultdepth 24
EndSection
Section "Module"
Load "glx"
Load "GLcore"
Load "v4l"
EndSection
Section "Device"
Identifier "Configured Video Device"
Boardname "vesa"
Busid "PCI:1:0:0"
Driver "nvidia"
Screen 0
EndSection

Section "Device"
Identifier "Device0"
BoardName "Generic Geforce 5500"
Driver "nvidia"
Vendorname "NVIDIA Corporation"
Option "DualHead" "1"
Option "ShadowFB" "1"
Option "FPScale" "1"
Option "TwinView" "True"
Option "TwinViewOrientation" "RightOf"
Option "UseEdidFreqs" "True"
Option "Metamodes" "1024x768,1024x768"
Option "UseDisplayDevice" "DFP"
EndSection

Section "Device"
Identifier "Videocard0"
Driver "nv"
VendorName "NVIDIA Corporation"
BoardName "GeForce 7600 GT"
EndSection
```

```
Section "InputDevice"
Identifier "Generic Keyboard"
Driver "kbd"
Option "XkbRules" "xorg"
Option "XkbModel" "pc105"
Option "XkbLayout" "us"
EndSection

Section "InputDevice"
Identifier "Configured Mouse"
Driver "mouse"
EndSection
Section "ServerLayout"
Identifier "Default Layout"
screen 0 "Default Screen" 0 0
EndSection

Section "Extensions"
Option "Composite" "Enable"
EndSection
```

xorg.conf for intel

- Make sure you try the solution here (including *sudo update-grub* and rebooting) before creating a new xorg.conf. It may solve your problem and you may not need this step.

```
Section "Device"
       Identifier      "Configured Video Device"
       Driver          "intel"
EndSection
#
Section "Monitor"
       Identifier      "Configured Monitor"
EndSection
#
Section "Screen"
       Identifier      "Default Screen"
       Monitor         "Configured Monitor"
       Device          "Configured Video Device"
EndSection
```

Installation of ATI and nVidia Graphics drivers

nVidia Driver

The current proprietary nVidia drivers are automatically installed using:

Menu -> System -> Administration -> Hardware Drivers

Look for the current drivers to activate there.

- Here are alternate manual instructions.
  - Please make a backup of xorg.conf before following this method.

```
sudo cp /etc/X11/xorg.conf /etc/X11/xorg.conf.bak
```

- Install the nvidia-settings package:

```
sudo apt-get install nvidia-settings
```

- Download the nVidia driver:

```
wget -O NVIDIA-Linux-x86-pkg1.run http://www.nvidia.com/Download/index.aspx?lang=en-us
sudo sh NVIDIA-Linux-x86-pkg1.run
```

and choose yes to any verbose response. After you install the driver, reboot your computer.

ATI Driver

If you have problems with ATI drivers after upgrading, check this link (http://wiki.cchtml.com/index.php/Ubuntu_Jaunty_Installation_Guide) for solutions to common problems with ATI.

Monitors / Displays

Turn off power saving

Even when on AC power, the power saver feature of Ubuntu sometimes changes the screen brightness to the battery setting on laptops. This was a problem with the ACPI power management module in the past, but should now be fixed. If not, change the settings:

> To access the Guidance Power Manager module, click on the power icon on the desktop taskbar.
> Change the brightness setting for "Battery powered" to maximum.

You can also turn off power management settings (invoked when the computer is idle):

> Menu -> System -> Preferences -> Power Management -> Display -> Put display to sleep when inactive for: *Never* -> Close

Configure Dual Monitors with nVidia

- Make sure that the nVidia driver has been installed and is functioning properly on your first screen. Also, make sure both monitors are connected.
- Menu -> Administration -> NVIDIA X Server Settings

  or from the command-line terminal (Terminal or Konsole) type:

```
sudo nvidia-settings
```

- Select "X Server Display Configuration".
  - You should see 3 boxes (2 if your card doesn't have an S-Video out). From here you can configure all of your card's outputs.

        - Check the "(Disabled)" box.
        - Select "Configure...".
            - The most common choice is TwinView. Select it.

- Setup the desired screen resolutions and positions of your two active displays.

    - The new display will likely have resolution set to "Auto" to match your first. Change this if you wish.
    - Leave the first screen's position as "Absolute" and set your second display's position relative to that.
    - "Clone" means the same output on both.

- Once you are satisfied with your settings, hit Apply to test them.

    - Note: if your displays are side-by-side, the kicker may extend across both screens as well as any maximized applications. This will be corrected when the X server is restarted.
    - If everything else is ok, hit "Save to X Configuration File". Now hit Ctrl+Alt+Backspace to restart X. You now have 2 screens!

- Troubleshooting: if the X server fails to reload you can recover your old X configuration. In a terminal:

```
sudo cp /etc/X11/xorg.conf.backup /etc/X11/xorg.conf
```

Hard Drives and USB Storage

USB Drives

Add MTP capability

Many MP3 players, as well as the latest Android devices, use MTP (http://en.wikipedia.org/wiki/Media_Transfer_Protocol) (Media Transport Protocol) for transferring data to the device storage.

- A Gnome-based utility, gMTP (http://gmtp.sourceforge.net/) , for managing MTP-capable devices is available:

```
sudo apt-get install gmtp
```

- Troubleshooting Android device connectivity: As a security precaution the newest Android devices do not have USB transfer capabilities turned on by default. It is necessary to carefully consult your device's user manual to find the method for enabling USB transfers (also known as "USB debugging mode" on many devices). For example, on my device, it was necessary to tap the "Settings -> About phone -> Build #" button 7 times to merely enable the USB debugging option, and then enable "Settings -> Developer options -> USB debugging" as a separate step!

Optical Drives

Printers & Scanners

The CUPS (http://www.cups.org/) printer interface recognizes many printers. Specific printers not recognized can often be installed using instructions found at the Linux Foundation OpenPrinting database (http://www.openprinting.org/printer_list.cgi) .

Add a Printer

Menu -> System -> Administration -> Printing -> Server -> New -> Printer

Most of the time, your printer (if connected and turned on) will be detected automatically.

My network printer with its own IP address at 192.168.0.124 was correctly installed at

socket://192.168.0.124:9100.

You can also choose printers on a Windows system via Samba and other types of networked printers (http://www.cups.org/documentation.php/network.html) , in addition to directly connected printers.

- An alternative method to access the CUPS interface is through a web browser. Go to the URL:

  http://localhost:631

Change default CUPS printer margins

- CUPS uses the maximum printable area of the chosen printer by default; there are no margins. The default settings for any printer can be changed in the PPD file for the specific printer found in the /etc/cups/ppd folder. Dimensions used in the PPD file are generally in points (in Postscript, 1 inch = 72 points). For my printer, Letter size is 612 x 792 points. I changed this to 576 x 756 points to make Letter size print 8 x 10.5 inches on the page.
- Another easy method (to adjust margins) is to create a Custom paper size with the desired margins and use this as the default. (This only works for printers whose PPD files allow custom paper sizes). For example, create a Custom paper size that is 8 inches x 10.5 inches (which would leave a 0.5 inch margin on all sides) and set it as the default. This is easiest to accomplish through the browser-based configuration utility. Start the CUPS interface through the web browser URL:

  http://localhost:631

Then from this interface set the Default Options for your printer:

CUPS -> Printers -> *My Default Printer* -> Set Default Options -> Media Size: Custom
-> Width: *8* -> Height: *10.5* -> Units: *Inches* -> Set Default Options

Now the "Custom.8x10.5" Media Size should appear in the Printer Options section for your printer. (You can then choose between this media size and the essentially marginless "Letter" media size at any time.)

Note: 8 x 10.5 inches = 203.2 x 266.7 mm = 576 x 756 points in Postscript (72 points per inch in Postscript).

Brother printers

Most Brother printers are auto-detected or can be installed directly from the CUPS interface. For additional drivers and instructions see the Brother help site (http://welcome.solutions.brother.com/bsc/public_s/id/linux/en/index.html) . For information on a specific model, see the Linux OpenPrinting site (http://www.openprinting.org /printer_list.cgi?make=Brother) .

- MFC-7820N

HP Printers

For Hewlett Packard printers / scanners, install hplip and hplip-gui.

```
sudo apt-get install hplip hplip-gui
```

- Add the printer:

  Menu -> Applications > System Tools > HP Toolbox

This should set up printer / scanners for scanning as well.

- For scanning, install Xsane:

```
sudo apt-get install sane xsane
```

Run:

  Menu -> Applications -> Graphics > Xsane image scanning

A full library of Linux drivers for HP printers is here (http://hplipopensource.com/hplip-web/index.html) .

Sound

If you get no sound with a fresh install, check that the sound levels are not set to zero. Click on the sound (speaker) icon on the panel, and then mixer. You may need to expand the dialog window to show labels. Ensure levels aren't set to zero, especially PCM.

PulseAudio

Sound in (K)Ubuntu is routed by Phonon either directly to your sound card or through the PulseAudio sound system. To use PulseAudio, you must install it. This can be done by installing the PulseAudio control modules (which will install pulseaudio as a dependency):

- Install PulseAudio with the control modules:

```
sudo apt-get install pavucontrol paprefs
```

- Although I no longer use it, in older versions of (K)Ubuntu I also (optionally) installed a system tray widget:

```
sudo apt-get install padevchooser
padevchooser
```

Some experimentation with the settings in

> Menu -> System -> System Settings -> Multimedia

may be necessary to make sound on your system work properly.

Try setting PulseAudio as the first sound system if you are having troubles getting sound (even if you are using ALSA). If that doesn't work, try making it the last choice.

Some programs require ALSA sound and try to send sound directly through ALSA drivers. Check your program's preferences section to see if ALSA is selected. You may have to switch to PulseAudio (or even OSSound) if you can't get sound.

HDMI with PulseAudio

I could only get my HDMI audio on my computer to work this way, and I can't quite figure out why it works.

- I checked to make sure my Mobile Intel 4 Series HDMI audio driver was installed (it is part of the most recent kernels):

```
aplay -l
aplay -L
```

This told me the HDMI card was recognized and configured properly. The problem was that no matter what I did, I couldn't get the sound piped through the HDMI card using ALSA, Kmix or any other settings (I tried every permutation).

- In PAVUControl I selected the HDMI card as the output device:

  Menu -> Multimedia -> PulseAudio Volume Control -> Configuration -> Internal Audio -> Digital Stereo (HDMI) Output

Then everything played through the HDMI audio card (through the cable to my HDTV).

This worked whether I had PulseAudio selected as the default audio or not (in System settings ->

Multimedia). Don't ask me why. If PulseAudio Volume Control is not yet installed, install it:

```
sudo apt-get install pavucontrol
```

- My HDMI port/output is only recognized if the HDMI cable is plugged in at bootup (it does not matter whether the HDTV power is on or not). If I plug in the HDMI cable after bootup, it isn't recognized.
- After doing this, every program I use works: VLC, Audacious, or whatever. It does not seem to matter whether the application is using Default, ALSA, or PulseAudio for the audio output plugin. None of this makes sense to me, but it works. I'm happy to be able to play HDMI movies (through VLC) to my HDTV.
- To change sound output back to my computer's internal speakers (ALSA), I returned the output setting:

  Menu -> Multimedia -> PulseAudio Volume Control -> Configuration -> Internal Audio -> Analog Stereo Output

Recording with PulseAudio

To set the PulseAudio inputs that will be recorded by an application (such as Audacity or FFMPEG), the recording must be already started! Only then can the inputs (to be recorded) be selectable in PulseAudio.

- For example, to record from a plug in microphone using Audacity, make sure the microphone is plugged in. Make sure in the Sound Mixer (icon) that the microphone is not muted and that the levels are set appropriately.
- In PulseAudio Volume Control, select the device that will be the input.

  Menu -> Multimedia -> PulseAudio Volume Control -> Input Devices -> Show: *All Input Devices*
  -> Internal Analog Audio Stereo: Port: *Analog microphone*

Of course, you should use the device you wish to use here. You can also select the *Monitor of Internal Analog Audio Stereo* device, which will use as an input to the recording/capture application whatever happens to be playing through the sound card (except for hardware inputs).

- Start Audacity (or other recording application). Make sure (in Audacity) that the Devices toolbar is visible:

  Menu -> Multimedia -> Audacity -> View -> Toolbars -> Device Toolbar (*ticked*)

Assuming you are using ALSA, make sure ALSA is selected, and that *pulse* is selected for both the output and microphone input on the Device Toolbar. Start recording.

- Start PulseAudio Volume Control. Under the Recording tab, you should see Audacity listed as "ALSA plugin: [audacity]: ALSA Capture from: *Internal Audio Analog Stereo*. If it isn't,

then select it. (This is the tricky part that took me a long time to discover.)

Airport Express

Airport Express with Pulse Audio

Audio output can be streamed over your local network to an Airport Express. These capabilities require pulseaudio-module-zeroconf (for the Zeroconf/Bonjour networking protocol) and pulseaudio-module-raop (for Airport Express).

- Install PulseAudio:

```
sudo apt-get install pulseaudio
```

  Reboot to finish the installation.

- Select PulseAudio as the output device in

  Menu -> System -> System Settings -> Multimedia -> Device Preference

  and move "Playback/recording through the PulseAudio sound server" to the top of every category (or at least the ones for which you wish to use PulseAudio).

- Test some audio (e.g. playback through Amarok) to make sure the PulseAudio system is working. Some applications specifically require that the PulseAudio output is specified in their configuration settings, and some applications require a separate PulseAudio plugin to function properly.

- Install additional modules in order to use Bonjour/Zeroconf and raop (Airport Express output):

```
sudo apt-get install pulseaudio-module-zeroconf pulseaudio-module-raop
```

- Install utilities to control the preferences and volume of various PulseAudio devices:

```
sudo apt-get install paprefs pavucontrol
```

- Enable discovery of the Airport Express by PulseAudio:

  Menu -> Settings -> PulseAudio Preferences (Sound Audio preferences) -> Network Access

and check both:

  Make discoverable network sound devices available locally
  Make discoverable Apple Airtunes devices available locally

- It is not clear to me which ports need to remain unblocked in order for Bonjour/Zeroconf and mDNS to discover the AEx. mDNS and Bonjour/Zeroconf use ports 5353, 5000, and

6000. (The PulseAudio server uses port 4713.) However, even when I unblock these the AEx doesn't seem to be able to be discovered until I turn off the firewall completely. (Once the AEx is discovered I turn the firewall back on and then have no other problems). I usually just add the IP address of the Airport Express on the LAN to the list of firewall-allowed connections. (Doing this still doesn't allow it to be discovered, though, for unclear reasons. Still, as long as a connection to the IP address of the AEx is allowed, I can turn the firewall back immediately after the AEx is located by the Zeroconf discovery and everything continues to stream fine.)

- If your LAN's router allows traffic-shaping (QoS prioritization), giving priority to the traffic to/from the Airport Express can improve performance. Finally, be aware that screensavers can interrupt uninterrupted smooth audio output from a PC. If traffic to the AEx becomes choppy, disable your screensaver.
- Open PulseAudio Volume Control:

  Menu -> Multimedia -> PulseAudio Volume Control

  - If the AEx has been successfully discovered (the firewall may have to be turned off temporarily in order for the AEx to be discovered) the name of the AEx should show up as an Output Device:

  PulseAudio Volume Control -> Output Device -> *My AEx Name*

  If desired, the AEx can be set as the default "fallback" output device to always be used:

  PulseAudio Volume Control -> Output Device -> *My AEx Name* -> click "Set as fallback" icon

  If it is not set as the default fallback output device, it must be manually selected as an output device each time.
- Start the application (such as Amarok or Audacious). To manually select which output device should be used, open PulseAudio Volume Control and choose the Playback output device for the application:

  PulseAudio Volume Control -> Playback -> *ALSA plugin [Amarok]: ALSA Playback on: -> My AEx Name*

  - The output volume (for any of the output devices) can be set:

  PulseAudio Volume Control -> Output Device -> *My AEx Name*

Troubleshooting

This was my old method. It works, but is probably unnecessary (and loads a lot of additional modules).

- Install padvechooser (which also install paman, pavumeter, and paprefs):

```
sudo apt-get install padevchooser
```

- Padevchooser is an applet for the taskbar panel. The PulseAudio Manager is accessible through the applet. Start Manager:

  Menu -> Multimedia -> PulseAudio Device Chooser -> Manager -> Devices -> Sinks

- Select the Airport Express as the output device ("sink"):

My AEx is discovered, but I got no sound through it until I selected it as the default sink (output) by one of two methods:

- From the PulseAudio Device Chooser:

Menu -> Multimedia -> PulseAudio Device Chooser -> Manager -> Devices -> Sinks
I then noted the name of my Airport Express device to be raop.Base-Station-e60157.local, so I entered that as the sink:
PulseAudio Device Chooser -> Default sink -> Other -> raop.Base-Station-e60157.local

raop-client (Airport Express streaming)

Another method to stream audio to the Airport Express uses raop-client, a tool written in Ruby. See information here (http://mriou.wordpress.com/) .

GSTransmit (Airport Express streaming)

GSTransmit (http://www.el-tunes.com/) is a tool to allow GStreamer-based utilities to stream output to an Apple AirTunes Device (such as the Airport Express). It is available as a self-installing .deb file from the website.

Airfoil (Airport Express streaming)

You can stream media from a PC running Windows or Mac OS X connected to an Airport Express network to your (K)Ubuntu Linux desktop, using Airfoil (http://www.rogueamoeba.com/airfoil/) . (Unfortunately you cannot send media output from (K)Ubuntu *to* the Airport Express network with Airfoil, only receive.) This can be useful in a distributed multimedia system, for example, in which your (K)Ubuntu PC is connected to a media center. You must be running Mono. You can download the .deb package at Rogue Amoeba (http://www.rogueamoeba.com/airfoil/linux/speakers.php) . Installation instructions are at Rogue Amoeba Linux support (http://getsatisfaction.com/rogueamoeba/topics/airfoil_cant_connect_to_linux_airfoil_speakers) .

Mice

Activate side-mouse-buttons in FireFox

Adding two lines to xorg.conf will activate side-mouse-buttons in FireFox.

- This should work with most brands of the 5-button mouse. Here is a list of mice that worked with this instruction.

  Logitech MX310
  Logitech MX510

Logitech MX518
Logitech MX700
Logitech MX Revolution
Intellimouse Explorer (first edition)
Razer Copperhead

- Backup X.org configuration file

```
sudo cp /etc/X11/xorg.conf /etc/X11/xorg.conf.bak
```

- Modify the X.org configuration file

```
kdesu kate /etc/X11/xorg.conf
```

- Find the Input Device section for your mouse and add two lines as shown below.
    - You may also increase the number of buttons if your mouse has more than 7 -- just fix the rest of the section based upon the number of buttons.
        Note: "back/forward", "wheel click" & "tilt left/right" all count as buttons

- Change:

```
Section "InputDevice"
 Identifier "Configured Mouse"
 Driver "mouse"
 Option "CorePointer"
 Option "Device" "/dev/input/mice"
 Option "Protocol" "ExplorerPS/2"
 Option "ZAxisMapping" "4 5"
 Option "Emulate3Buttons"       "true"
EndSection
```

to:

```
Section "InputDevice"
 Identifier "Configured Mouse"
 Driver "mouse"
 Option "CorePointer"
 Option "Device" "/dev/input/mice"
 Option "Protocol" "ExplorerPS/2"
 Option "ZAxisMapping" "4 5"
 Option "Emulate3Buttons" "true"
 Option "Buttons" "7"
 Option "ButtonMapping" "1 2 3 6 7"
EndSection
```

Touchpad

For Synaptics Touchpads:

```
sudo apt-get install gsynaptics
```

For more info, see the Ubuntu help wiki (https://help.ubuntu.com/community/SynapticsTouchpad) .

Wacom Pen Tablets

Support for the Wacom pen tablet is integrated into Jaunty by default, including for hotplugging. For more info, see the Ubuntu documentation (https://help.ubuntu.com/community/Wacom) .

Fingerprint Readers

- See the Ubuntu support page (https://wiki.ubuntu.com/FingerprintAuthentication) .
- See the Debian support page (https://wiki.debian.org/FingerForce) .
- See the Freedesktop fprint (http://www.freedesktop.org/wiki/Software/fprint/) support page.

Smart Card Readers

- Read the Debian wiki (https://wiki.debian.org/Smartcards) for full information about implementation of a smart card reader solution and this Debian wiki page (https://wiki.debian.org/Smartcards/OpenPGP) for smart card / OpenPGP integration.
- See this list (https://www.linux.com/learn/docs/ldp/750-Smart-Card-HOWTO#APPLICATIONS) of smart card applications for Linux.

PC/SC

PC/SC (http://www.linuxnet.com/index.html) is a set of cross-platform drivers, middleware, and other tools and applications for various smart cards and readers.

- Install the PC / SC Smart Card Daemon (*pcscd*):

```
sudo apt-get install pcscd pcsc-tools
```

- Find out if the Smart Card Reader is recognised:

```
pcsc_scan
```

- Install middleware from the Smart Card Reader manufacturer.
- Consider registering a personal certificate with an authority such as LuxTrust (https://www.luxtrust.lu/en) .
- These instructions work with the SCR331 (http://www.identive-group.com/products-and-solutions/identification-products/desktop-readers-terminals/contact-desktop-readers/scr331-usb-smart-card-reader) Smart Card reader, but may be applicable to other devices

as well.

OpenCryptoki

OpenCryptoki (http://sourceforge.net/projects/opencryptoki/) is a Debian / Ubuntu-supported (http://manpages.ubuntu.com/manpages/lucid/man7/opencryptoki.7.html) implementation that includes drivers and libraries to enable PKCS (http://en.wikipedia.org/wiki/PKCS) #11 tokens and IBM cryptographic hardware such as Trusted Computing Platform (TPM) cryptographic devices. Install:

```
sudo apt-get install opencryptoki
```

GnuPG Smart Cards

GnuPG-PKCS11 (http://gnupg-pkcs11.sourceforge.net/index.html) implements a BSD-licensed smart-card daemon to enable the use of PKCS (http://en.wikipedia.org/wiki/PKCS) #11 tokens with GnuPG.

- Install the PKCS Smart Card Daemon:

```
sudo apt-get install gnupg-pkcs11-scd
```

Remote Controls

LIRC (Infrared Remote Controls)

LIRC (http://www.lirc.org/) (Linux Infrared Control) allows you to use most infra-red remote controls (http://lirc.sourceforge.net/remotes/) . This can be installed from Menu -> Applications -> Ubuntu Software Center -> System -> lirc

or

```
sudo apt-get install lirc
```

Remuco (Bluetooth and WiFi Remote Controls)

Remuco (http://code.google.com/p/remuco/) is a utility for controlling many multimedia players (http://code.google.com/p/remuco/wiki/Features) (such as VLC, Amarok, Rhythmbox, Audacious, and many others) using a Bluetooth or WiFi remote control (http://code.google.com/p/remuco/wiki/ClientDevices) . Each player has its own package. For example, the VLC package is named remuco-vlc and can be installed:

```
sudo apt-get install remuco-vlc
```

Bluetooth

BlueZ (http://www.bluez.org/) is the package that allows Bluetooth connectivity in Ubuntu Linux. This package is included within the current kernel of Ubuntu. To add utilities to check whether your Bluetooth adapter's firmware is current, install:

```
sudo apt-get install bluez-utils bluez-firmware
```

then run

```
sudo dfutool
```

WiiMote

The Wiimote (Wii Remote Control) uses both Bluetooth and Infra-red technology. It communicates with Ubuntu Linux using the incorporated BlueZ Bluetooth drivers and/or LIRC drivers. (It can function with Bluetooth alone, however.) You will need a Bluetooth receiver on your PC (such as a Bluetooth USB stick or built-in Bluetooth receiver, for example). (Note: not all Bluetooth receivers will work with the Bluez drivers. Check this list (http://www.wiili.org /index.php/Compatible_Bluetooth_Devices) or test yours first.)

- Install the cwiid (https://help.ubuntu.com/community/CWiiD) Wiimote controller package and the lswm Wiimote discovery package:

```
sudo apt-get install wminput lswm
```

- Install the drivers (or just reboot):

```
modprobe uinput
```

Note: You can also add uinput to the modules files so it loads automatically at bootup:

```
sudo echo "uinput" >>/etc/modules
```

Run (while pressing button 1/2 on the Wiimote):

```
sudo wminput
```

For more info, and to learn how to enable the infra-red functions, see this guide (http://ubuntuforums.org/showthread.php?t=993376) .

USB

Wireless Cards

Atheros Cards

Atheros Wireless cards should work automatically with the new kernel by installing the proprietary driver. At installation, after the first reboot, you will be prompted whether to use the proprietary drivers.

It should no longer be necessary to install the following package:

```
sudo apt-get install madwifi-tools
```

These instructions for the Atheros 802.11 b/g integrated card are here for reference only (or if you wish to install them manually instead):

- Download the latest 'snapshot' driver from Madwifi (http://snapshots.madwifi-project.org/) . When I was doing it, the version was:

```
madwifi-hal-0.10.5.6-current.tar.gz
```

- Extract the files
- Make sure your linux headers and build-essential packages are installed:

```
sudo apt-get install build-essential
sudo apt-get install linux-headers-$(uname -r)
```

- Unload any drivers already running.

```
sudo ifconfig ath0 down
sudo ifconfig wifi0 down
```

- Change to the directory where you extracted the driver.

```
cd <directory_where_driver_unzipped>
```

- From that directory, run the installation scripts:

```
cd scripts
sudo ./madwifi-unload
sudo ./find-madwifi-modules.sh $(uname -r)
cd ..
```

- Complete the installation by compiling the source and installing it.

```
sudo make
sudo make install
```

- Add the installed drivers to your system.

```
sudo modprobe ath_pci
```

Following this, Network Manager was able to see the wireless card and I was able to configure everything else (WEP / WPA key, etc.) from there.

Complete instructions are available at MadWifi UserDocs (http://madwifi-project.org/wiki/UserDocs/FirstTimeHowTo) .

Atheros AR242x

Alternate instructions for installing the Atheros AR242x card are here (http://madberry.org/2008/11/how-to-get-atheros-ar242x-to-work-on-810-intrepid-ibex/) .

3G

3G protocols (http://en.wikipedia.org/wiki/3G) allow wide area cellular communications that include not only cellphone voice transmission but also integrated broadband internet connections. This can be integrated into a single device, or communications can be received through an EVDO adapter. Examples of 3G radio interfaces include Mobile WiMax, CDMA-2000, TD-CDMA, EDGE, and DECT. For info using 3G with the Ubuntu Network Manager, see this page (https://wiki.ubuntu.com/NetworkManager/Hardware/3G) . For additional info on using 3G with Ubuntu, see this guide (https://wiki.ubuntu.org/NetworkManager/Hardware/3G/Probing) .

he220r1

he220r1 (http://huaweie220.blogspot.com/) is a (K)ubuntu driver package for the Huawei e220 USB modem. It has also been found to work with other 3G devices, such as Nokia, Sony Ericsson, and Motorola. See the website for download and installation instructions.

T-Mobile Option 225 (Web'N'Walk) Stick

This website (http://www.relst.nl/site/index.php/handleidingen/200-make-your-t-mobile-web-n-walk-stick-option-225-work-with-ubuntu.html) offers a driver optimised for the T-Mobile Web'n'Walk Stick/Option 225.

Virgin Huawei e169

See this Ubuntu forum solution (http://ubuntuforums.org/showthread.php?t=1014221) :

```
sudo gedit /etc/ppp/options
```

find the line that says:

```
#-chap
```

and uncomment it (delete #)

```
-chap
```

this (I think) disables CHAP authentication

I also had to change the APN to VirginBroadband instead of VirginInternet which was the default, and now it's happy.

```
Other settings
Number *99#
Uname <your virgin username>
PW <your virgin password>
```

EVDO Cards

EVDO cards include USB modems and adapters to receive wide-area cellular broadband Internet connections.

Sprint

Sprint EVDO cards can be used most easily through KPPP. For instructions, read the Sprint Mobile Broadband Setup Guide (http://www4.sprint.com/pcsbusiness/downloads/Sprint_Mobile_Broadband_Setup_Guide.pdf) . Also see the EVDO Forums (http://www.evdoforums.com/thread5925.html) .

Verizon

See this Crystal Networking guide (http://www.crystalnetworking.net/?p=17) .

Tethering your PC to your Verizon cell phone

This is a per-minute plan in which you can use Verizon broadband services through your cell phone (such as the Motorola RAZR) connected to your PC via a USB cable. See this guide (http://www.aselabs.com/articles.php?id=224) .

Digital Cameras

WebCams

See the Ubuntu webcam guide (https://help.ubuntu.com/community/Webcam) for more info. Many webcams that worked in Hardy Heron may not work in Intrepid Ibex. This may be due to a migration from v4l (video for Linux) to v4l2. See this discussion (http://ubuntuforums.org/showthread.php?t=983574) .

EasyCam

EasyCam2 (https://help.ubuntu.com/community/EasyCam) is a utility for finding and installing drivers for your webcam. See these installation instructions (https://help.ubuntu.com/community/EasyCam) .

iSight

Linux drivers for the digital iSight camera (connected by FireWire), using ALSA for sound, are here (http://sourceforge.net/projects/lisight/) . The video component is already supported by current kernels (see here (http://lisight.sourceforge.net/) for more information).

Luvcview (USB webcam viewer)

Luvcview can be used to view your USB webcam to test it. Install:

```
sudo apt-get install luvcview
```

View your webcam:

```
luvcview -f yuv
```

Netbooks

Ubuntu can be installed on netbooks. (See this this page for laptop and netbook compatibility reviews (https://wiki.ubuntu.com/LaptopTestingTeam) .) At this time the Ubuntu Netbook Remix (or equivalent) is preferred to the standard Gnome-based desktop, especially for new users. Ubuntu Netbook Remix (https://wiki.ubuntu.com/UNR) is provided to several individual netbook manufacturers (such as Asus and Acer) to be optimised for that device. (You can contact your specific netbook manufacturer for specific details on this product.) If you already have Ubuntu Netbook Remix (or eeebuntu Netbook Remix) installed, you can choose to add the full Ubuntu (Gnome) desktop, if you wish:

```
sudo apt-get install ubuntu-desktop
```

- Asus eeePC 1000H
    - Reduce font size one or two sizes, and set the screen DPI to 120.
    - eeebuntu Netbook Remix (http://www.eeebuntu.org/index.php?page=nbr) is available for this device.
- Dell Mini 9
    - Ubuntu Netbook Remix runs on this device well. See this guide (http://www.ubuntumini.com/2008/10/ubuntu-810-intrepid-ibex-on-dell-mini-9.html) .
- HP Mini 1000 Mi
    - A custom edition of Ubuntu is installed on this version of this device (http://www.hp.com/united-states/campaigns/mini1000/hpmini1000_mie.html) . No additional configuration is necessary.
- Samsung NC10
    - Some package should be installed for keyboard functions (FN Key+functions).

The procedure to install these package is available in this forum (http://www.voria.org/forum/viewtopic.php?t=41) .

Another method is to install Ubuntu onto your netbook from scratch using a USB flashdrive LiveCD.

Acer Aspire One

There are several Ubuntu-based and other Linux-based OS's specially customised for the Acer Aspire One. Some of them are:

- DebianAcerOne (http://wiki.debian.org/DebianAcerOne)
- Kuki Linux (http://www.kuki.me/)
- Linux4One (http://www.linux4one.it/)
- Lord-Linux (http://ubuntuaceraspireone.nireblog.com/post/2009/04/21/lord-linux-stable-rev2-acer-aspire-one)
- eeebuntu Netbook Remix (http://www.eeebuntu.org/index.php?page=nbr) is available for this device as well. See this article (http://osnews.com/story/20743/Eeebuntu_2_0_SD_Card_Installation_on_the_Aspire_One) for the necessary tweaks.

Also see the Ubuntu website (https://help.ubuntu.com/community/AspireOne) for detailed tweaks and fixes. More useful information can be found in the Ubuntu Linux sub-forum (http://www.aspireoneuser.com/forum/viewforum.php?f=28) at aspireoneuser.com

Palm

Mobile Devices

Ubuntu Linux offers an operating system for Mobile Devices (such as the Samsung Q1 Ultra or Elektrobit MIMD) with a unique and simplified interface. For more information see the Ubuntu MID Edition (http://www.ubuntu.com/products/mobile) site.

MP3 / Video Players

iPod

- gtkpod (http://www.gtkpod.org/wiki/Home) is a utility that uses the native iPod DB in a way similar to iTunes. Files on the iPod can be synchronised to a Linux-based PC with this utility. Install:

```
sudo apt-get install gtkpod
```

Usage instructions are here (http://www.gtkpod.org/index.php?title=Documentation) .

Copy files from iPod to computer

I do not like using gtkpod and prefer to listen to the files on my iPod with different audio players

and in different formats. Furthermore, the iPod naming and database conventions are quite outdated and non-standard (the iPod is, after all, a VERY old device).

- It is desirable that all the files on the iPod have ID3v2 tags on them already. These tags will be used to rename the files after they are transferred. With the iPod connected to the computer to which the iPod is originally synchronised, use iTunes to make sure all the files are updated with current ID3v2 tags (prior to any copying / transfers).

- Plug the iPod into a USB port on the (K)Ubuntu computer. Open the Nautilus (or other) file manager and create a folder in which to store the files from the iPod. (Nautilus will usually automount the iPod once it is connected.) Copy the files from the iPod to the newly created folder on the (K)Ubuntu computer. The iPod naming convention assigns a random 4-letter code to each file. If there are a large number of files, they are split between folders, each with about 250 files in them. When copying, there is likely to be some duplicate 4-letter filenames. Simply add an extra character to the duplicate 4-letter filenames when prompted about duplicates (turning them into 5-letter filenames). For example if there are 2 files named *AXYJ.m4a*, when Nautilus attempts to copy the second file to the folder it will prompt for a new filename. Name the second file, for example, *AXYJ2.m4a* and carry on. Repeat as many times as necessary untill all the files are successfully copied (with unique filenames) into the folder on the (K)Ubuntu computer.

- Now use an ID3 tag editor such as EasyTAG to rename the files that have been copied to the (K)Ubuntu computer folder. EasyTAG includes a renaming utility that will scan and then rename the files based on the Artist and Title (for example) found in the ID3v2 tag. Allow EasyTAG to do this and then "Save File(s)" with the new filenames (using the FloppyDisc Icon in the toolbar). The resulting files will now be appropriately named (instead of having the archaic and arbitrary Apple filenames).

    - EasyTAG will notify you of an error (and will stop) if a file with a duplicate Artist - Title exists. When such an event occurs, move the first re-named file out of the folder (into a *Duplicates* folder, for example) and then allow EasyTAG to continue converting the remaining files. Do this as many times as necessary. (This helps to weed out duplicates, as well.)

- Of course, you can also update other information in the the ID3v2 tags (to your preference) with EasyTAG at the same time, as well.

- Convert the format of any .m4a files to .mp3, .aac, .ogg (or any other desired audio format) using a batch format convertor such as SoundKonvertor (for Qt / KDE), SoundConvertor (for GTK / Gnome), Xcfa, Sox, or dir2ogg. (Usually ubuntu-restricted-extras must also be installed, and sometimes libfaac0 as well).

Sansa Fuze

The Sansa Fuze is a very high quality MP3 audio as well as video player. It is recognized by default as a USB device in Ubuntu/Kubuntu. To convert videos into a format that can be copied to the player, use Video4Fuze (http://code.google.com/p/video4fuze/downloads/list) .

- Download and install:

```
wget http://video4fuze.googlecode.com/files/fuzemux-0.1_amd64.deb
wget http://video4fuze.googlecode.com/files/video4fuze-0.6_all.deb
sudo dpkg -i fuzemux-0.1_amd64.deb
sudo dpkg -i video4fuze-0.6_all.deb
```

Use *fuzemux-0,1_i386* instead of *fuzemux-0.1_amd64.deb* if using a 32-bit OS.

- Start video4fuze from the command line:

```
video4fuze
```

or create a menu item with the Command: video4fuze.

- Convert files (mpg or mp4) using Video4Fuze. Do not use the Sansa Fuze player as the output folder, but use an output folder on your computer. Once the files have been converted, then copy them directly to a Video folder on the Sansa Fuze (using Nautilus in Ubuntu or Dolphin in Kubuntu).

- I like k9copy to extract something (that I have saved) on a DVD to an mp4 (.avi) first. The Sansa Fuze likes video at 224 x 176 and DivX 4/5, so I extract to those specifications:

  Menu -> Multimedia -> k9copy -> Input: DVD -> Output: MPEG-4 encoding -> folder icon: /home/*user/Videos*
  k9configure -> MPEG-4 -> Video -> Codec: MPEG-4 (DivX 4/5) -> Width: 224 -> Height: 176 -> Audio: mp3 (lame) -> Bitrate: 128

I then use video4fuze to convert the extracted mp4 (.avi) into the format that the Sansa Fuze likes.

- Limitations: At this time Flash videos (.flv) cannot be converted directly by Video4Fuze. You must convert flash videos to another format (such as .mpg or mp4/.avi) prior to Video4Fuze conversion, using a converter such as mencoder or ffmpeg (e.g. with WinFF as the GUI).

MachSpeed Trio

The MachSpeed Trio works natively with (K)Ubuntu Linux. Files can be copied directly to the device from a File Manager (Dolphin or Nautilus).

- Video formats include .mpg, .flv and .avi. However, the screen is 7.5 cm x 4 cm, which is a 1.875 ratio (widescreen). If your video has a 1.33 ratio (fullscreen), you must add left and right padding to make it look normal. If your video is 320 x 240, for example, you must add left and right padding of 64 each (making it 448 x 240, which is approximately a 1.875 ratio).

  In addition, I found I had to convert some videos twice (using ffmpeg) to get it into a format the Trio would accept. For example, I have a 160x120 .avi video I recorded on my camera. (This requires 32 padding on each side instead of 64.) There was a 2 step conversion required to get it into a format the Trio liked:

```
ffmpeg -i cameravideo.avi -target ntsc-dvd -s 160x120 tempvideo.avi
ffmpeg -i tempvideo.avi -padleft 32 -padright 32 triovideo.avi
```

The first step does whatever it takes to get the video into a NTSC-compatible format. However, it encodes into the ac3 audio codec, which the Trio doesn't like. The second step converts the audio from the ac3 format to the default mp2 audio format (which the Trio likes better) as well as adds the padding (which in reality can be done in either step). I have tried to simplify this into a single command but haven't figured out how to do it yet.

I then copy the converted file directly onto the Trio, where it plays.

Speech Recognition and Synthesis

For more info see the Ubuntu Wiki -- Speech recognition (https://wiki.ubuntu.com/SpeechRecognition) and the Ubuntu Community wiki -- Text-to-Speech (https://help.ubuntu.com/community/TextToSpeech) . Integrated voice recognition is an ongoing project; accumulated information is available at VoxForge (http://voxforge.org/) .

- Julius (http://julius.sourceforge.jp/en_index.php) -- open source continuous speech recognition / grammar engine (Japanese only -- does not have an English acoustic module currently). Install:

```
sudo apt-get install julius julius-voxforge
```

- CMU Sphinx (http://cmusphinx.sourceforge.net/) -- open source voice recognition software. Install:

```
sudo apt-get install sphinx2-bin sphinxbase-utils pocketsphinx-utils
```

Apps using voice recognition (also see this list (http://www.tldp.org/HOWTO/Speech-Recognition-HOWTO/software.html)):

- Gnome Voice Control (http://live.gnome.org/GnomeVoiceControl) (sudo apt-get install gnome-voice-control)
- CVoice Control (http://www.kiecza.net/daniel/linux/) (formerly KDE Voice Control)

Festival

- Festival (http://www.cstr.ed.ac.uk/projects/festival/) is a Text-to-Speech synthesis system. See the manual (http://www.cstr.ed.ac.uk/projects/festival/manual/) for usage instructions. Also see tips from the Ubuntu Community help (https://help.ubuntu.com/community/TextToSpeech) page. Install:

```
sudo apt-get install festival
```

- Flite (http://www.speech.cs.cmu.edu/flite/) (Festival-lite) is a small, fast run-time synthesis engine designed for small embedded machines and/or large servers. Flite is designed as an alternative synthesis engine to Festival for voices built using the FestVox suite of voice building tools. Install:

```
sudo apt-get install flite
```

- FestVox (http://festvox.org/) is a tool to build new synthetic voices, relying on the Festival framework. Search for *festvox* in your Package Manager to find voices already created and distributed in (K)Ubuntu.

Networking

Only one network manager and GUI interface can be enabled. Network-Manager is installed by default, but many users prefer Wicd Network Manager (http://wicd.sourceforge.net/) .

Network Manager

Network Manager (http://en.wikipedia.org/wiki/NetworkManager) is the network manager installed by default in (K)Ubuntu. It has a tray applet that allows you to switch between Internet connections (such as wireless APs or wired connection).

Wicd Network Manager

Wicd Network Manager (http://wicd.sourceforge.net/) is a GTK-dependent networking manager written in Python that can be used in all variants of (K)Ubuntu. Many users (including me) report it to be faster and more stable than Network Manager. To avoid networking conflicts, Wicd requires the removal of Network Manager prior to installation (replace *network-manager-kde* with *network-manager* if using Ubuntu instead of Kubuntu).

```
sudo apt-get remove network-manager-kde
sudo reboot
sudo apt-get install wicd
```

Set a static IP address

- Precise Pangolin (12.04 LTS) is the first version of (K)Ubuntu in which I have been able to get Network Manager to accept my static IP address settings (for both wired and wireless connections).

  Network Manager -> Manage Connections... -> *connection* -> Edit... -> IPv4 address -> Method: Manual -> IP Address: *192.168.0.111* -> Subnet Mask: *255.255.255.0* -> Gateway: *192.168.0.1* -> OK

  I also add the DNS servers I like to use (I don't use the DNS servers of my ISP for security reasons).

- If you only use only a wired interface, you do not need a network manager and it can be removed if desired. Doing so requires configuring the networking settings manually.
    - In Precise, Network Manager does not need to be removed if manual settings are used in /etc/network/interfaces. To allow the settings to take effect (and the network connection to be "unmanaged" by Network Manager), edit /etc/NetworkManager /NetworkManager.conf:

```
sudo kate /etc/NetworkManager/NetworkManager.conf
```

and change the following section so that it reads *false*:

```
[ifupdown]
managed=false
```

Then restart Network Manager:

```
sudo /etc/init.d/network-manager restart
```

    - Edit the /etc/network/interfaces file (use the *gedit* text editor instead of *kate* if using Ubuntu instead of Kubuntu):

```
sudo kate /etc/network/interfaces
```

    - and replace the line (ok if line is missing)

```
iface eth0 inet dhcp
```

    - with the following lines (using your own LAN settings and desired DNS-nameservers, of course):

```
auto eth0
iface eth0 inet static
address 192.168.0.35
netmask 255.255.255.0
network 192.168.0.0
broadcast 192.168.0.255
gateway 192.168.0.1
dns-nameservers 8.26.56.26 208.67.222.222 8.20.247.20 208.67.220.220 8.8.8.8 8.8.4.4
```

    - Then restart networking:

```
sudo /etc/init.d/networking restart
```

    - Check to see if your settings are now correct:

```
ifconfig
```

- The Wicd network manager also allows a wireless connection to have a static IP.
- In versions prior to Precise Pangolin (12.04 LTS) I was not able to get Network Manager to accept my static IP address settings. If you only use only a wired interface, you do not need a network manager and it can be removed.
- Remove Network Manager (replace *network-manager-kde* with *network-manager* if using Ubuntu instead of Kubuntu):

```
sudo apt-get remove network-manager-kde
sudo reboot
```

- Edit the /etc/network/interfaces file (use the *gedit* text editor instead of *kate* if using Ubuntu instead of Kubuntu):

```
sudo kate /etc/network/interfaces
```

- and replace the line (ok if line is missing)

```
iface eth0 inet dhcp
```

- with the following lines (using your own LAN settings, of course):

```
auto eth0
iface eth0 inet static
address 192.168.0.35
netmask 255.255.255.0
network 192.168.0.0
broadcast 192.168.0.255
gateway 192.168.0.1
```

- Then restart networking:

```
sudo /etc/init.d/networking restart
```

- Check to see if your settings are now correct:

```
ifconfig
```

Manual configuration from the command-line

3 steps for WEP:

```
sudo iwconfig eth[N] essid [SSID]
sudo iwconfig eth[N] key restricted s:[PASSWORD]
sudo dhclient
```

WPA is more complicated:

```
sudo mkdir /etc/wpa_supplicant
cd /etc/wpa_supplicant
sudo echo network = { > wpa_supplicant.conf
sudo echo ssid="SSID" >> wpa_supplicant.conf
sudo echo key_mgmt=WPA-PSK >> wpa_supplicant.conf
sudo echo psk="PRESHAREDKEY" >> wpa_supplicant.conf
sudo echo } >> wpa_supplicant.conf
cd /etc/network
sudo gedit interfaces
```

Now add after "auto eth[N] ..." & "iface eth[N] .." :

```
wpa-driver wext # or whatever driver your network card needs
wpa-conf /etc/wpa_supplicant/wpa_supplicant.conf
```

Save the file and restart your system.

Internet connection sharing (DHCP server)

In most LANs, an inexpensive router is used to provide DHCP (http://en.wikipedia.org /wiki/Dynamic_Host_Configuration_Protocol) functions (internet connection sharing).

However, DHCP services can also be provided by a single host computer on your LAN (http://en.wikipedia.org/wiki/Local_area_network) if it is directly connected to the Internet. (This is useful, for instance, if you have a 3G or other wireless EVDO connection to your computer which you want to share with the other computers on your LAN). Other client computers on your LAN would then connect to the Internet through your host computer's Internet connection. The host computer now essentially performs the DHCP functions of a router.

All "client" computers on the LAN ought to be connected to a central LAN switch or router. (If using a router, it should have its own DHCP functions disabled -- you shouldn't have 2 DHCP servers on a LAN unless you know how to nest LANs). They should all be set up to obtain DHCP-assigned dynamic IP addresses and use the same LAN subnet settings (which in the example below is LAN IP range *10.0.0.1 - 10.0.0.250* with netmask *255.255.255.0* and gateway *10.0.0.1*). The host computer to be used as the gateway/DHCP server is then connected (through its own ethernet port) either to one to the ports of the switch (if used), or to a LAN port of a router (don't use the WAN port). The host computer then connects directly to the Internet (WAN (http://en.wikipedia.org/wiki/Wide_area_network)) through a second port (which in the example below will be a wireless (wifi) port (wlan0)).

(Note: This setup is easiest if you connect all computers on the LAN with Ethernet cables to the central switch or router. But also see using a nested wireless LAN router below.)

(Note: If you want your LAN to use the same subnet as your WAN, see network interface bridging.)

- Install the DHCP server and firewall programs:

```
sudo apt-get install dhcp3-server firestarter
```

- Rename the startup command (through a symbolic link) for the DHCP server. This is

required or Firestarter will not know where to find it:

```
sudo ln -sf /etc/init.d/dhcp3-server /etc/init.d/dhcpd
```

- Edit the DHCP server configuration file:

```
sudo nano -w /etc/default/dhcp3-server
```

Change the line

```
INTERFACES=""
```

to

```
INTERFACES="eth0"
```

- Restart the DHCP server:

```
sudo dhcpd restart
```

- Right click on Network-Manager -> Edit Connections... -> Wired -> Add

  -> Connection name: *Shared internet connection*
  -> IPv4 Settings -> Method: Manual -> Add
  -> Address: *10.0.0.1* -> Netmask: *255.255.255.0* -> Gateway: 0.0.0.0
  -> Available to all users: [x]

- Attach the ethernet cable to (eth0).

  Network-Manager -> Wired Networks -> *Shared internet connection*

- Adjust your firewall to allow the internet connection sharing. Start Firestarter:

```
sudo firestarter
```

- Tell the firewall which port is your direct Internet Connection:

Firestarter -> Preferences -> Firewall -> Network Settings -> Internet connected network device: (wlan0)

-> IP address is assigned by DHCP: [x]

- Tell the firewall which port is for the LAN, and specify the details for the LAN:

Firestarter -> Preferences -> Firewall -> Network Settings -> Local network connected device: (eth0)

-> Enable internet connection sharing: [x]
-> Enable DHCP for the local network: [x]
-> DHCP server details -> Create new DHCP configuration -> Lowest IP address to assign: *10.0.0.2*
-> Highest IP address to assign: *10.0.0.250* -> Name server: <dynamic>

Note: Use your own desired LAN settings (internal DHCP-assigned dynamic IP (http://en.wikipedia.org/wiki/Static_IP#Static_and_dynamic_IP_addresses) address range), of course. In this example I don't use the full IP range *10.0.0.2 - 10.0.0.255* for dynamic IP addresses because I want to reserve some LAN addresses (*10.0.0.251 - 10.0.0.255*) to be used as static IP addresses).

- Notes:
  - If you wish to use this setup all the time, make the "*Shared internet connection*" profile your default connection profile in Network Manager.

Using a nested wireless LAN router

Many users will already have an established LAN that uses an existing wireless router and has client computers that are setup to connect wirelessly to the router. Here's how to maintain this setup and still use the internet connection sharing method of a single host computer as described above. This method is known as **nested LANs**. The wireless router will serve as a nested LAN for its wireless clients (only), but in turn will appear as a single device to the main LAN. The two LANs must have different IP ranges. For example, the main LAN may have an IP range *10.0.0.1 - 10.0.0.255* (with netmask *255.255.255.0*), as in the above example. The router's nested wireless LAN must then use a different IP range (for example *192.168.0.1 - 192.168.0.255* with netmask *255.255.255.0*).

- Do not use your wireless router's WAN (Internet) port.
- Connect the host computer (to be used as your main LAN gateway/router) to a LAN port (not the WAN/Internet port) of the wireless LAN router.
- Configure your wireless router's LAN so that it appears to be a *single device* to the main LAN:
  - Setup your wireless router so that the Internet Connection type is "Static IP" (often in the "Internet Setup" section). Configure the settings so that its "Internet IP address" is within the static IP address range of your main LAN (e.g. *10.0.0.254*), and make sure the subnet mask matches the one you chose for your main LAN (e.g. *255.255.255.0*). The gateway setting should be set to match the IP address of your host computer of the main LAN (e.g. *10.0.0.1* in the example of the preceding section). Now the wireless router will appear to the host computer as just another device on the main LAN.
  - If your wireless LAN is already functioning, you probably don't have to change any settings, but double-check to make sure the schema are compatible. Configure the wireless router's settings for the nested wireless LAN. This is done by enabling the router's DHCP server functions (in "Network Setup" or some similar configuration section of the router). The router ought to have as its own wireless LAN gateway address a "local IP address" (or "LAN IP address") of *192.168.0.1* (for the IP address range used in this example), and a "starting IP address" (for the DHCP-assigned

dynamic IP address range to be used for the wireless clients) to be *192.168.0.2* or greater. (Some routers ask you to specify the entire range (such as *192.168.0.2 - 192.168.0.255*.)

- Make sure all your wireless client computers are set to obtain their DHCP-assigned dynamic IP addresses from the wireless router (gateway IP *192.168.0.1*) instead of from the main LAN gateway.
- Now all communications from the wireless client computers will be routed to the wireless LAN router first, which will then in turn route them to the host computer (which is acting as the main LAN gateway/router), which will then in turn route them to the Internet (WAN).
- Note: The host computer for the main LAN must have a static IP address (e.g. *10.0.0.1* as in the example of the preceding section) and it must match the gateway IP address configured in the wireless LAN router settings.

Network Interfaces Bridging

- Install bridge-utils to be able to create network bridges:

```
sudo apt-get install bridge-utils
```

- Edit /etc/network/interfaces:

```
sudo nano /etc/network/interfaces
```

The interfaces file should look like this after editing it:

```
auto eth0
iface eth0 inet manual
#
auto br0
iface br0 inet dhcp
#
bridge_ports eth0 wlan0
#
# The loopback network interface
auto lo
iface lo inet loopback
```

- Restart networking with:

```
sudo /etc/init.d/networking restart
```

Using Dynamic IP addresses for a webserver

Normally, domain name servers (DNS) that are used publicly on the Internet match a web server's URL name with the IP address of the server's host computer. If your computer has a static IP address (http://en.wikipedia.org/wiki/IP_address#IP_address_assignment) , then you can publish your own web server's URL as belonging to the static, unchanging IP address of your

computer.

However, if your IP address is dynamic (http://en.wikipedia.org/wiki/IP_address#IP_address_assignment) (always changing) because you use an ISP (Internet Service Provider) that constantly changes your IP address (using DHCP), then you will need a Dynamic DNS service to constantly keep track of your dynamically changing IP address and match it to of your web server's URL. Fortunately, there are a few Dynamic DNS services that will do this for you, either for a small fee or even for free. For more info, see this Ubuntu Community help (https://help.ubuntu.com/community/DynamicDNS) article.

For specific tips on setting up Dynamic DNS, see this article.

Filesharing

NFS

NFS is the default networking protocol for network file sharing in *nix systems (including (K)Ubuntu Linux). Here are some tips for setting up NFS from the Little Girl's Mostly Linux Blog (http://mostlylinux.wordpress.com/network/nfshowto/) .

Samba File Sharing

Samba client

Samba is a networking protocol that allows compatibility with Windows-based networks. The Samba client is installed by default in Ubuntu and should work seamlessly (unless you have have a firewall blocking the ports).

Samba server

Samba (http://www.samba.org/) provides file/print services for the SMB/CIFS protocol used in Windows-based networks. See the official Ubuntu documentation (https://help.ubuntu.com/10.10/serverguide/C/windows-networking.html) for more information about providing services in a Windows network. A Samba server can be installed using the tasksel option during installation of the Ubuntu server from the LiveCD, or at any time using:

```
sudo tasksel install samba-server
```

- An alternative method of installation is:

```
sudo apt-get install samba samba-tools system-config-samba smbfs
```

  Note: samba-tools, system-config-samba, and smbfs are optional.

- Modify Samba settings.
  - Method 1:

Menu -> System -> Administration -> Samba
(Note: this is available only if you installed system-config-samba.)

It is recommended that your user be a member of the sambashare group, as well.

- Method 2:

Enable File Sharing Server With User Login (Very Reliable Method)

Do the following on the machine that has the files to be shared:

- Add current user to Samba:

```
sudo smbpasswd -a username
```

(replacing username with your login username)

- Open the samba config file:

```
sudo nano /etc/samba/smb.conf
```

- Add the directories to be added (right at the end) in the following format:

```
[Pictures]
path = /home/username/<folder_to_be_shared>
```

(Replace username with your username and <folder_to_be_shared> with the folder you want to share)

Press CTRL+X and then Y to save.

- Restart Samba:

```
sudo service smbd restart
sudo service nmbd restart
```

Note: Prior versions used:

```
sudo /etc/init.d/samba restart
```

- On Windows access the folder in the following format in Windows Explorer:

```
\\192.168.x.x
```

(replace 192.168.x.x with the actual IP address of your server which is serving the folder)

- On Linux type the following in Konqueror or Nautilus:

```
smb://192.168.x.x
```

(replace 192.168.x.x with the actual IP address of your server serving the folder)

Note: If you use Sharing in KDE's System Settings panel, be aware that there is a small bug, reported here (https://bugs.launchpad.net/ubuntu/+source/kdenetwork/+bug/95452) . In brief, you need to comment out/delete any instances of these two lines in /etc/smb.conf :

```
case sensitive
msdfs proxy
```

Change your Workgroup

To change your Samba (Windows network) workgroup:

```
sudo nano /etc/samba/smb.conf
```

Look for the line:

```
workgroup = WORKGROUUP
```

and change the setting to whatever your LAN workgroup is.

Recognizing Win98 machines

Microsoft networking is extremely quirky. To enable recognition of PCs with Windows 98, edit your Samba configuration file:

```
sudo nano /etc/samba/smb.conf
```

Then add the following lines to the file:

```
[global]
# THE LANMAN FIX
client lanman auth = yes
client ntlmv2 auth = no
```

Integrating into Mac OS X Network

See this guide (http://www.zaphu.com/2008/04/30/five-guides-on-how-to-integrate-ubuntu-into-a-mac-os-x-network/) for information on integrating Ubuntu into an existing Mac OS X Appletalk network.

FTP Server

An FTP server allows the easy transfer of files between systems over the network. Clients such

as Filezilla can be used to interact with an FTP server. Also see these FTP tips.

vsftpd

vsftpd (http://vsftpd.beasts.org/) is an FTP server available in (K)Ubuntu. For configuration information, see the official Ubuntu documentation (https://help.ubuntu.com/11.10/serverguide/C/ftp-server.html) . Install:

```
sudo apt-get install vsftpd
```

proftpd

Proftpd (http://www.proftpd.org/) is an FTP server available in (K)Ubuntu that can be used with either the MySQL or PostgreSQL database. Also see the Ubuntu Community documentation (https://help.ubuntu.com/community/ProFTPD) . Install:

```
sudo apt-get install proftpd-basic
```

WebDAV

WebDAV (http://en.wikipedia.org/wiki/WebDAV) is a method for allowing remote access to local folders via an HTTP-based web browser or file manager. This can be combined with user authentication (using LDAP or other password mechanism).

- See this page for instructions.

Local Area Network

Modems / Dial-up

Network Manager does not accept modem connections. See Ubuntu help (https://help.ubuntu.com/10.10/internet/C/modem.html) for information on identifying and connecting with a modem. These instructions require gnome-network-admin (install while connected to a wired ethernet connection):

```
sudo apt-get install gnome-network-admin
```

Gnome PPP and wvdial

Gnome PPP (http://en.wikipedia.org/wiki/Gnome-ppp) is a discontinued GUI frontend for the wvdial (http://alumnit.ca/wiki/index.php?page=WvDial) PPP modem dialer. It is still available as a package. Install:

```
sudo apt-get install gnome-ppp wvdial
```

See this forum thread (http://ubuntuforums.org/showthread.php?t=931872) for tweaks required to make Gnome PPP and wvdial operational in Lucid.

GPPP

GPPP was the default modem dialing application in previous versions of Ubuntu.

> Menu -> Applications -> Internet -> GPPP Internet Dial-up

Remote Access

There are several methods of remote access. VNC sharing allows you to view and control a remote computer's desktop. (Windows users use a similar proprietary protocol called remote desktop protocol (RDP)). XDMCP allows a complete remote X-windows based login. Remote connections are hazardous unless proper security precautions are taken to prevent unauthorized logins and to ensure encryption of transmitted data.

SSH

Secure Shell or SSH is a network protocol that allows data to be exchanged over a secure channel (or "tunnel") between two computers. Encryption provides confidentiality and integrity of data. The OpenSSH client is installed by default in Ubuntu so you can connect to another computer that is running an SSH server.

Connect to a remote SSH server

From the command-line terminal

Install the OpenSSH (http://www.openbsd.org/cgi-bin/man.cgi?query=ssh&sektion=1) client (if not already installed):

```
sudo apt-get install openssh-client
```

From the command-line Terminal type:

```
ssh -C <username>@<computer name or IP address>
```

> Note: The -C option indicates compression, which speeds up transmission through the tunnel.

For example:

```
ssh -C joe@remote.computer.xyz
```

> or:

```
ssh -C mike@192.168.1.1
```

or

```
ssh -C 192.168.1.1 -l mike
```

Note: -l specifies the login id.

If the SSH server is listening on a port other than port 22 (the default), you can specify that in your connection (with the -p option). For example, if the SSH server is listening on port 11022, connect:

```
ssh -C joe.friday@remote.computer.xyz:11022
```

or

```
ssh -C remote.computer.xyz -p 11022 -l joe.friday
```

If you have made a public/private key using ssh-keygen, the private key must be stored in /home/*user*/.ssh. The key should be accessible only to *user*

```
sudo chmod 600 /home/user/.ssh/identity
```

or

```
sudo chmod 600 /home/user/.ssh/id_rsa
```

To login with the key:

```
ssh -C remote.computer.xyz -p 11022 -l joe.friday
```

Note: You can run the command as a menu item, but the command must be "run in terminal."

Port forwarding through SSH

- See Using SSH to Port Forward for full details.
- In brief, use

```
ssh -C <remote ip> -p <SSH tunnel port> -L <local port>:<remote computer>:<remote port> -l <user>
```

This specifies that any communications from your computer (localhost) going out through <local port> will be transmitted securely through the the SSH tunnel port. To use VNC through the tunnel, you would use an application like Krdc or Vinagre:

```
krdc vnc://localhost:<local port>
```

Note: *localhost* is equivalent to (and interchangeable with) *127.0.0.1*. Either can be used.

Note that for VNC, the default <local port> is 5900. In general, a remote VNC server (such as X11VNC) is also listening on the default <remote port> 5900 as well. The default <SSH tunnel port> is 22, as discussed above. All these can be changed, however, if you desire greater security.

For me, I noticed that I had to set <remote computer> to be the internal LAN IP address of the remote **computer** (such as 192.168.1.155) instead of the remote **router'**s IP address, which is specified in <remote IP>. (If the remote computer has a static IP address (i.e. is directly connected to the Internet without an intervening router), then <remote computer> and <remote ip> would be the same.)

Example: For extra security, my SSH Server uses <SSH tunnel port>=11022. I want to VNC to a remote computer on a remote LAN with a router whose IP address is <remote ip> = 244.205.123.123. The remote computer to which I want to connect has a static IP address within the remote LAN of <remote computer> = 192.168.1.155. I have set up an X11VNC server on this computer that is listening on <remote port> = 6912 (instead of the default 5900). I setup port forwarding on the router of this remote LAN to forward port 6912 to this server computer. I want to VNC to this remote computer from my laptop, through the Internet. My laptop VNC client (Krdc) will use the default <local port> = 5900. My name is <user> = joe.friday. This is my story.

```
ssh -C 244.205.123.123 -p 11022 -L 5900:192.168.1.155:6912 -l joe.friday
krdc vnc://localhost:5900
```

If you have set up a private/ public key pair with a passphrase, or if your SSH server requires a passphrase, of course, you will be prompted for the passphrase after issuing the SSH command.

Note: Port forwarding assumes that the ports are also forwarded through the router(s) and through any firewalls. See the documentation for your router(s) and firewall to learn how to do this. The advantage of SSH tunneling is that only the <SSH tunnel port> needs to be open and forwarded by a router. All encrypted communications will go through your router using this single port. This is what makes the communications secure.

PuTTY

PuTTY (http://www.chiark.greenend.org.uk/~sgtatham/putty/) is a GTK-based GUI client-interface for SSH connections and eases the setup for port forwarding, SSH public key authentication, and automated login. A user would run Putty to create the SSH tunnel (instead of the ssh command) and then run a program such as Krdc or Vinagre. PuTTY is available for both Linux and Windows (but for routine Linux usage OpenSSH is generally recommended instead).

```
sudo apt-get install putty putty-tools
```

- To create a 2048-bit RSA key pair compatible with OpenSSH, it is possible to use Puttygen (http://linux.die.net/man/1/puttygen) (part of Putty-tools). (For me the Linux version of Puttygen is occasionally buggy, however, so I recommend OpenSSH keygen for routine

usage instead):

```
puttygen -t rsa -b 2048 -O private -o putty_rsa.ppk
puttygen putty_rsa.ppk -O public-openssh -o id_rsa.pub
puttygen putty_rsa.ppk -O private-openssh -o id_rsa
```

- Move the OpenSSH-compatible keys to the ~/.ssh (i.e. the /home/*user*/.ssh) folder

```
mv id_rsa* ~/.ssh
```

- Copy the public key (/home/*user*/.ssh/id_rsa.pub) to the server that is hosting the OpenSSH server, into the /home/*serveruser*/.ssh (for whichever user is the administrative user for the server -- generally the user that installed the server initially). If the SSH tunnel is (still) set at default port 22, you can copy the key using the utility:

```
ssh-copy-id serveruser@remoteserver.computer.xyz
```

- Connect a VNC client (such as Krdc) through SSH using the command-line:

```
putty -ssh -i ~/.ssh/id_rsa -l serveruser -L 5900:127.0.0.1:5900 remoteserver.computer.xyz -P 22
krdc vnc://127.0.0.1:5900
```

or as a single command:

```
putty -ssh -i ~/.ssh/id_rsa -l serveruser -L 5900:127.0.0.1:5900 remoteserver.computer.xyz -P 22 sleep 5; krdc vnc:
```

- Alternatively, the PuTTY SSH Client GUI can be run (from Menu -> Internet -> PuTTY SSH Client) and options configured from there.

Using keys created by Puttygen in OpenSSH

The public security key generated by Puttygen in Windows is generally not compatible with OpenSSH security keys unless it is edited. For example, the default OpenSSH key is 2048-bit RSA (SSH-2). When a 2048-bit RSA (SSH-2) PuTTY public/private key pair is generated (by Puttygen) in Windows (see this tutorial (http://unixwiz.net/techtips/putty-openssh.html)), the public key looks like:

```
---- BEGIN SSH2 PUBLIC KEY ----
Comment: "rsa-key-20100302"
AAAAB3NzaC1yc2EAAAABJQAAAQEAjdp567qxsGkhELlMQup2mXHdsveCWq/maU6k
unPpbkwEuhkasuOrhkAWgv5v3d8S857zdHcfnXWi2FkEaJuFxqpJ2IkFuvqRdqYD
ZCcASj2S0LoXdWpC4uon6VH8oBT31r+wkDfmI2a+K74jgXjtm1BWWxwOpKaWQHi9
YItbY/O6renRex34n3ejO2OJRqD/BxnFU7ND41Szo3ZMKoa0yzhevU2ntt74BCvC
bYFHdSoRbi3AH8qGInzFfhXPdrG8qA382ZKEh5Bmy8Qxb9Uen/+jjP51YxN/ykee
RwSrdSCZekB6jN6uuTLNDEXJSJizqlPU8tROqf3pYv1kxzD9bw==
---- END SSH2 PUBLIC KEY ----
```

- To be used by OpenSSH, the saved public key must be edited.

- Delete the first two lines (with the BEGIN and Comment: in them) and the last line.
- Join the remaining lines into a single line.
- Place ssh-rsa at the beginning.
- It should end up looking like:

```
ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAQEAjdp567qxsGkhELlMQup2mXHdsveCWq/maU6kunPpbkwEuhkasuOrhkAWgv5v3d8S857zdHcfnXWi2Fk
```

- Once the PuTTY public key is in this format, it can be appended to the ~/.ssh /authorized_keys file on the OpenSSH server. (The private key stays on the client computer, of course). PuTTY can then connect (from Windows or Linux) to an OpenSSH server using the public/private key method.

Connect using SSH Agent

With SSH Agent you can automate the use of public key authentication and open an XDM or VNC session using a script. See this tutorial (http://kimmo.suominen.com/docs/ssh/#ssh-agent) .

Also see this alternative simple approach: Connect with SSH and start an application with a single command.

Setup an SSH server

Install the OpenSSH (https://help.ubuntu.com/10.10/serverguide/C/openssh-server.html) server:

```
sudo apt-get install openssh-server
```

or

```
sudo apt-get install tasksel
sudo tasksel install openssh-server
```

Note: The OpenSSH server can also be installed when doing a server installation as an option from the LiveCD.

Note: An OpenSSH server can also be set up on a Windows server using Cygwin. See these instructions (http://pigtail.net/LRP/printsrv/cygwin-sshd.html) .

- Don't forget to forward the port on which your OpenSSH server is listening. The default SSH port is 22; if the default is used, the router should therefore forward port 22 to the computer on the LAN that is hosting the OpenSSH server. The OpenSSH listening port can be changed; in fact, each computer on the LAN can listen on its own unique SSH port, if desired. The router must forward each specified listening port to the correct computer. Therefore, if computer 1 has its OpenSSH server set to listen on port 22221, then the router should forward port 22221 to computer 1's LAN IP address. If computer 2 has its OpenSSH listening port set to 22222, then obviously the router must forward port 22222 to computer 2's LAN IP address. To change the listening port of the OpenSSH server, edit the /etc/ssh /sshd_config file (use the *gedit* text editor instead of *kate* if using Ubuntu instead of

Kubuntu):

```
sudo kate /etc/ssh/sshd_config
```

and change the listening port from 22 to your desired listening port:

```
Port 22221
```

then restart the OpenSSH server:

```
sudo /etc/init.d/ssh restart
```

- For greater port security (and to minimize brute-force attacks (http://en.wikipedia.org/wiki/Brute-force_attack)), consider using Knockd.

Limit authorized SSH users

- See Limit the user accounts that can connect through OpenSSH remotely

OpenSSH Public Key Authentication

See this OpenSSH Public Key Authentication Tutorial (http://sial.org/howto/openssh/publickey-auth/) .

In brief, it is necessary to generate a public / private key pair. On your client machine, generate the pair:

```
ssh-keygen
```

A prompt asks for a passphrase. If you wish to use OpenSSH without a password from a secure client (to which no one but you has access), leave the passphrase blank. If you enter a passphrase, you will be asked for this passphrase each time you use the SSH client. By default, a 2048-bit RSA SSH-2 key pair is generated and stored in the /home/*user*/.ssh folder. The private key is named id_rsa and is meant to stay in that folder. (The public key is id_rsa.pub and is meant to be copied to the OpenSSH server.)

- The private key must only be accessible (and should be read-only) to *user*, the owner of the file:

```
chmod 600 /home/user/.ssh/id_rsa
```

You could also make the entire .ssh folder accessible only to *user*:

```
chmod 700 /home/user/.ssh
```

- Copy the public key (/home/*user*/.ssh/id_rsa.pub) to the server that is hosting the OpenSSH

server, into the /home/*serveruser*/.ssh (for whichever user is the administrative user for the server -- generally the user that installed the server initially). If the SSH tunnel is (still) set at default port 22, you can copy the key using the utility:

```
ssh-copy-id serveruser@remoteserver.computer.xyz
```

- The ssh-copy-id utility only works over port 22. An alternative if you have changed your SSH port is to copy the /home/*user*/.ssh/id_rsa.pub key to the server manually. On the server make sure the directory /home/*serveruser*/.ssh exists and that there is a file authorized_keys (with write privileges) in that folder. If not, create such a file while logged into the server as *serveruser* (the touch command creates an empty file):

```
mkdir ~/.ssh
cd ~/.ssh
touch authorized_keys
```

Then concatenate the id_rsa.pub key you have copied to the ~/.ssh folder. (Make sure the owner of id_rsa.pub, after copying, is *serveruser*.):

```
cd ~/.ssh
chown serveruser id_rsa.pub
cat authorized_keys id_rsa.pub >> authorized_keys
```

- Make sure the OpenSSH server knows to look for the key file. On the remote server, edit the OpenSSH configuration file:

```
sudo nano /etc/ssh/sshd_config
```

- Uncomment the line (i.e. remove the # at the beginning of the line):

```
#AuthorizedKeysFile %h/.ssh/authorized_keys
```

- Remove the ability to login to the OpenSSH server using password authentication:

```
 sudo nano /etc/ssh/sshd_config
```

- Change the line

```
#PasswordAuthentication yes
```

to

```
PasswordAuthentication no
```

- Restart the OpenSSH server:

```
sudo /etc/init.d/ssh restart
```

- Now you can connect securely with an SSH tunnel without requiring a password, logging in as *serveruser*.

```
ssh -l serveruser -L 5900:127.0.0.1:5900 remoteserver.computer.xyz -p 22
```

Connect with SSH and start an application with a single command

- If you have created an OpenSSH key pair (without a password), you can start both the SSH tunnel and a VNC program (such as Krdc or Vinagre) to run through the SSH tunnel with a single command:

```
ssh -f -l serveruser -L 5900:127.0.0.1:5900 remoteserver.computer.xyz -p 22 sleep 5; krdc vnc://127.0.0.1::5900
```

    - Alternatively (and probably preferably) you can create a Menu Item / Shortcut with the above command.

Note: This command is a command-line mini-script. The SSH option -f option tells the SSH client to fork into the background after starting. (This option is not available in the PuTTY client.) This allows the command line to continue to proceed to the next command(s) listed on the command line mini-script. The 5 second wait ("sleep") timeout allows time for the SSH tunnel to be created before proceeding to the next command. (This can be lengthened if necessary.) After the wait period, the program (Krdc VNC in this example) is started.

- Of course, any program could be started (to be run through the SSH tunnel) in this fashion, not just a VNC program.

Automate SSH connections that require a password

This method is strongly advised against. Transmitting an unencrypted password through the Internet (in order to establish an SSH connection) invites password sniffing. Use the OpenSSH key pair methods described above, instead. This method is listed here for reference.

- Terminal interactions (such as the SSH password challenge) can be automated using the expect (http://linux.die.net/man/1/expect) utility. Install:

```
sudo apt-get install expect
```

- If, for example, your SSH client ID is *clientuserID*, yourpassword is *not#1sostrong*, and the remote SSH server is *remoteserver.computer.xyz* (using the default SSH port of *22*), then use this command to start the SSH tunnel:

```
expect -c 'spawn ssh -l clientuserID -L 5900:127.0.0.1:5901 remoteserver.computer.xyz -p 22; expect assword ; send
```

There are other parameters in this example. *5900* and *5901* are the ports to be used on either

side of the tunnel (port *5900* is used for VNC, for example). See Port forwarding through SSH for more details.

You can use the entire command as a menu item (must be "Run in terminal" in the Advanced menu options).

VNC

Virtual Network Computing (VNC) mirrors the desktop of a remote ("server") computer on your local ("client") computer (it is not a separate remote login, as is XDMCP). A user on the remote desktop must be logged in and running a VNC server (such as X11VNC, Vino, or Krfb). Keyboard and mouse events are transmitted between the two computers. VNC is platform-independent —– a VNC viewer on one operating system can usually connect to a VNC server on any other operating system. (Windows users can use one of several clients such as UltraVNC Viewer (http://www.uvnc.com/docs/uvnc-viewer.html) .)

Vino Remote Desktop VNC server

Vino-server (the Gnome VNC server) is included by default in Ubuntu. Start:

Menu -> System -> Preferences -> Remote Desktop

- You can accept uninvited connections in the Security section. You can require a password for these connections.
- This implementation of Vino does not allow changing the default listening ports (which start at 5900). If you wish to customize your VNC connection, use X11VNC instead.
- A user can connect using Vinagre, the Terminal Server Client, or any other VNC client.

How to securely use VNC with SSH tunneling

It is less secure to leave the VNC listening port open to the Internet, even with a password. (This can expose you to password cracking attempts.)

It is more secure to use SSH to tunnel your VNC connection. Under SSH port forwarding, the VNC listening port is the <remote port>. To increase security, this listening port can be changed from the default 5900. Only the VNC server and the SSH client need to specify the <remote port> in a secure connection.

X11VNC Server

While Vino is easy to use, X11VNC allows far more customization and therefore can be used more in situations where greater security is needed.

- Install an X11VNC server to share your desktop with other computer:

```
sudo apt-get install x11vnc
```

- Run X11VNC without a password:

```
x11vnc -forever -rfbport 5900
```

Note: -rfbport 5900 specifies the port to listen on. The port number can be changed. This option is not required if the default port 5900 will be used. Don't forget to open/forward this port in your firewall/router. By default X11VNC server exits after the first client disconnects. To keep it running (and allow future connections), use the -forever option. See here (http://www.karlrunge.com/x11vnc/x11vnc_opts.html) for more command line options.

- Create a password to use with X11VNC:

```
mkdir ~/.vnc
x11vnc -storepasswd YOUR_PASSWORD ~/.vnc/x11vnc.pass
```

- X11VNC can then be started with a password:

```
x11vnc -forever -rfbport 5900 -rfbauth ~/.vnc/x11vnc.pass -o ~/.vnc/x11vnc.log -loopbg -display :0
```

- You can create a startup script so that X11VNC is automatically loaded at startup (with password settings):

```
echo "/usr/bin/x11vnc -forever -rfbport 5900 -rfbauth ~/.vnc/x11vnc.pass -o ~/.vnc/x11vnc.log -loopbg -display :0"
chmod +x ~/.config/autostart/x11vnc.sh
```

- You can test the startup script:

```
~/.config/autostart/x11vnc.sh
```

Using VNC with SSH

See Port forwarding through SSH for additional information.

Vinagre VNC client

Vinagre (http://library.gnome.org/users/vinagre/stable/index.html.en) is the default Gnome-based VNC client used in Ubuntu.

- Menu -> Applications -> Internet -> Remote Desktop Viewer

Terminal Server Client

The Terminal Server Client is an Ubuntu/Gnome frontend for rdesktop (http://www.rdesktop.org/) (for RDP connections to Windows computers) and one of several vncviewer clients (for VNC connections). In can be used instead of Vinagre.

- Menu -> Applications -> Internet -> Terminal Server Client

- To use it with VNC, one of the VNC clients must be installed first. For example, install the TightVNC (http://www.tightvnc.com/) client:

```
sudo apt-get install xtightvncviewer
```

  - Note that the TightVNC client can be used from the command line (or as a menu item) directly:

```
vncviewer 192.168.0.12::5900
```

  where *192.168.0.12* is an example *host* location that is running a VNC server on port 5900. For more command-line options, use

```
man vncviewer
```

Krdc VNC client

Krdc is the default VNC client in Kubuntu/KDE but can be used in GNOME. It can be used for both VNC and RDP connections. Installing it will also install the Qt platform and many KDE utilities (a large download).

```
sudo apt-get install krdc
```

- Run:

  Menu -> Applications -> Internet -> Krdc

- The command-line connection (for use as a menu-item, for example) is:

```
krdc vnc://<remote IP>
```

- If the remote (Krfp) VNC server is using a <remote port> other than the default 5900 port, use

```
krdc vnc://<remote IP>:<remote port>
```

- Krdc can also connect to a Windows server using RDP (Remote Desktop Protocol).

```
krdc rdp://<remote IP>:<remote port>
```

Using a VNC client with SSH

See this howto (http://jeltsch.org/node/209) for an automated setup using a script (it did not work for me, but it might for you).

In brief, you would initiate an SSH tunnel with port forwarding using Putty or the command line:

```
ssh -C <remote ip> -p <SSH tunnel port> -L <local port>:<remote computer>:<remote port> -l <user>
```

then you would start a VNC client such as Krdc:

```
krdc vnc://localhost:<local port>
```

<local port> will usually be the default 5900, in which case you could simply use

```
krdc vnc://localhost
```

XVNC4Viewer VNC Client

XVNC4Viewer is an alternative to Vinagre or the Terminal Server Client (vncviewer). Install:

```
sudo apt-get install xvnc4viewer
```

Automatic user login (for use with VNC)

VNC only works if a user is logged in. When a computer (hosting one or more servers) is intended to start up unattended and VNC (with or without SSH tunneling) is to be used, the computer ought to start with the primary user logged in. To accomplish this:

Menu -> System -> System Settings -> Login Manager -> Convenience -> Enable Auto-Login (*ticked*) -> Lock session (*ticked*)
-> Pre-select user: Specified: *Choose primary user* (i.e. the user hosting the SSH tunnel, if any, and the VNC server)
-> Automatically log in again after X server crash (*ticked*)

- Also make sure the VNC server is set to Autostart at bootup.

FreeNX

FreeNX (https://help.ubuntu.com/community/FreeNX) is a remote desktop display server/client solution that natively incorporates SSH tunneling (unlike VNC). It is therefore more secure than VNC (unless VNC is coupled with SSH tunneling).

FreeNX Server

The Free server .deb package can be downloaded from No Machine free server downloads (http://www.nomachine.com/select-package.php?os=linux&id=1) .

- Alternatively, add the following repositories:

```
sudo add-apt-repository ppa:freenx-team
```

- Install the package:

```
sudo apt-get update
sudo apt-get install freenx
```

FreeNX Client

Download the self-installing .deb file from No Machine Client downloads (http://www.nomachine.com/select-package-client.php) .

XDMCP

XDMCP (http://www.tldp.org/HOWTO/XDMCP-HOWTO/index.html) allows a separate remote login by an authorized user. This login is separate from the local user.

- XDMCP is not secure over the Internet and should only be used within a LAN. It cannot be tunnelled through SSH. It is turned off by default in Ubuntu. To enable it, edit the configuration file:

```
gedit /etc/gdm/custom.conf
```

- Find and change (or add) the line from false to true so that it reads:

```
[Xdmcp]
Enable=true
```

Telnet

SSH is, basically, secure Telnet.

VPN clients

A VPN (http://en.wikipedia.org/wiki/Virtual_private_network) (Virtual Private Network) allows a secure encrypted connection ("tunnelling") over the Internet between a client (either standalone or on a separate LAN) and a home or corporate LAN server.

VPN through Network Manager

- The default Network Manager in Ubuntu/Kubuntu has a VPN client available. This includes support for IPSec and Cisco-compliant VPN connections. Install:

```
sudo apt-get install network-manager-vpnc
```

- To connect to a VPN network using OpenVPN (SSL), install the plugin:

```
sudo apt-get install network-manager-openvpn
```

- To connect to a VPN network using PPTP (MS Windows servers), install the plugin:

```
sudo apt-get install network-manager-pptp
```

- Configure:

    Network Manager icon (in system tray) -> VPN Connections -> Configure VPN

vpnautoconnect (vpn daemon)

vpnautoconnect (http://sourceforge.net/projects/vpnautoconnect/) is a daemon to allow automatic vpn connections through Network Manager. Download (http://sourceforge.net/projects/vpnautoconnect/files/) and install the .deb package for your OS version.

Other VPN clients

Standalone VPN clients based on protocol are available (but not necessary if using Network Manager):

- vpnc (http://www.debuntu.org/how-to-connect-to-a-cisco-vpn-using-vpnc) , grml-vpn (http://grml.org/online-docs/grml-vpn.8.html) -- for Cisco-compliant (IPSec) VPN networks
- openswan (http://www.openswan.org/) -- for IPSec (OpenSwan) VPN networks
- pptp-linux (http://pptpclient.sourceforge.net/) -- for PPTP (MS Windows-compliant) VPN networks
- openvpn (http://openvpn.net/) , gadmin-openvpn-client -- for OpenSSL (OpenVPN) VPN networks

VPN servers

OpenVPN

OpenVPN (http://openvpn.net/) is a free, GPL-licensed open-source cross-platform VPN solution based on OpenSSL (not IPSec). Install the server (then see the website for further installation instructions):

```
sudo apt-get install openvpn bridge-utils
```

A GUI configuration utility (GTK-based) is available:

```
sudo apt-get install gadmin-openvpn-server
```

Also see these installation tips.

Poptop (PPTP Server)

Poptop (http://poptop.sourceforge.net/) is a free open-source PPTP-based VPN server compatible with MS-windows PPTP clients. Install:

```
sudo apt-get install pptpd
```

OpenSwan

OpenSwan (http://www.openswan.org/) is the open source implementation of IPSec-based VPN connections for Linux (and is a successor to FreeSwan). Install:

```
sudo apt-get install openswan linux-patch-openswan
```

Citrix

(*Under construction.*)

- Citrix Client -- Ubuntu Community Help (https://help.ubuntu.com/community/CitrixICAClientHowTo)
- Installing Citrix -- Ubuntu Wiki (https://wiki.ubuntu.com/InstallingCitrix)
- Citrix Xen App plugin -- Ubuntu Community Help (https://help.ubuntu.com/community/CitrixXenAppPlugin)

Security

Ubuntu by default is a fairly safe system. However, if you intend to use Ubuntu as a server, or for critical applications in which loss of data (by accident or by malicious intrusion) would be disastrous, you should learn how to make Ubuntu more secure. A good introduction to Ubuntu Security Best Practices (http://www.psychocats.net/ubuntu/security#bestpractices) is available. Recommended reading includes the book *Cyber War (http://www.harpercollins.com/books/9780061962233/Cyber_War/index.aspx)* by Richard Clark (http://en.wikipedia.org/wiki/Richard_A._Clarke) and this interview (http://news.cnet.com/8301-27080_3-20004505-245.html) with Joe Weiss (IT advisor for the energy-sector smart grid). Also read read this CNN Money article (http://money.cnn.com/2013/04/08/technology/security/shodan/index.html?iid=HP_LN) .

Firewall

Network communications go through "channels" called ports. You can restrict which ports are available ("open") for network communications, creating a barricade to unwanted network intrusion. Firewalls do this job for you. But I guarantee that if you install one before you know

how to use it that one or more networking programs on your system will stop working. Read every bit of documentation about a firewall before installing it -- you won't regret the time invested. All of these packages modify iptables (http://en.wikipedia.org/wiki/Iptables) , which is the set of rules that controls network access in and out of your computer. (You can modify iptables manually from the command line, as well, but if you are that much of an expert, you probably don't need this guide.) Also see the official Ubuntu documentation (https://help.ubuntu.com/12.04/serverguide/firewall.html) .

Firestarter

Firestarter (http://www.fs-security.com/) is an intuitive firewall manager used to set the iptables values which provide firewall capabilities in Linux (including Ubuntu). It has a very easy-to-use GUI.

```
sudo apt-get install firestarter
```

- When running Firestarter, some common outgoing ports that ought to be opened/unblocked/"allowed" include 80 (HTTP), 443 (HTTPS), 53 (DNS), 993 (secure IMAP), 465 (secure SMTP), 123 (NTP).

Firestarter fails to open system log

This is a problem in Precise. See the solution here.

Shorewall

Shorewall (http://shorewall.net/) (Shoreline Firewall) is an open-source firewall configuration manager for Netfilter / Iptables that does not require a background process to be running. It supports VPNs. Install the IPv6 version:

```
sudo apt-get install shorewall6
```

or the "lite" IPv6 version:

```
sudo apt-get install shorewall6-lite
```

- Alternatively, the IPv4 version can be installed:

```
sudo apt-get install shorewall
```

or the "lite" version:

```
sudo apt-get install shorewall-lite
```

Guarddog

Guarddog (http://www.simonzone.com/software/guarddog/) is a GUI firewall configuration utility that was used for the KDE 3.1 desktop series. It has a complex array of configurations, and is difficult to use for some beginners. As of (K)Ubuntu 11.04 Lucid Lynx, Ubuntu repositories no longer carry Guarddog. To obtain legacy packages, see here (http://packages.ubuntu.com/lucid/guarddog) .

Uncomplicated Firewall

Uncomplicated Firewall (http://wiki.ubuntu.com/UncomplicatedFirewall) is installed in (K)Ubuntu by default, but all ports are open initially. It is configurable through the command-line interface. See this forum thread (http://ubuntuforums.org/showthread.php?t=823741) , or this usage tutorial (http://www.ubuntu-unleashed.com/2008/05/howto-take-use-setup-and-advantage-of.html) , or Ubuntu community help (https://help.ubuntu.com/community/UFW) for tips on how to set up and use it. If not installed, it can be installed:

```
apt-get install ufw
```

Gufw

Gufw (http://gufw.tuxfamily.org/index.html) is a graphical user interface for Uncomplicated Firewall. Install:

```
sudo apt-get install gufw
```

Anti-virus

- If you are running a file server, interface frequently with Windows drives or share files with Windows users, or use virtualization, you will want a virus checker for your Windows files.
- Despite extensive minsinformation, Linux is not immune from malware (witness the explosion of malware being created for the Linux-based Google Android systems). The malware is not usually spread within the OS itself (as long as the OS is a well-respected distribution obtained through official channels), but in trojan programs downloaded and installed by users outside of the normal software distribution channels (i.e. repositories) of the OS. There is always a danger to using programs downloaded from the Internet from sources other than respected repositories -- it is the primary reason that Debian and (K)Ubuntu retain tight control over their software repositories.
- Any file can have malware embedded in it (which is trivial to achieve by concatenation, for example: *cat originalfile.avi malware.exe > originalfileplusmalware.avi*). The question is whether a user will try to open a file with a program (such as a media player) that has been compromised in a way that allows it to execute the code found in the infected media (e.g. .avi) file. This can occur not only for Windows users but for any OS (including Mac OSX and Linux) with a compromised program (e.g. media player). An example is the extensive problems the Mac OS community is currently having with the Flash player.

- Routine scanning of any file downloaded from the Internet, any file imported from another user's computer (even a trusted source, since their attention to virus prevention may not be as compulsive as yours), or any attachment received in an email (even from a trusted sender) should be done with an anti-virus program.

ClamAV

ClamAV (http://www.clamav.net/) is the open source virus tool for Linux. To install ClamAV:

```
sudo apt-get install clamav
```

- If an error is returned: "The database directory must be writable for UID 1000 or GID 1000" in order for the virus database to be updated, then change the ownership of the installation directory (/var/lib/clamav):

```
sudo chown 1000 /var/lib/clamav
```

ClamTk (ClamAV GUI)

ClamTk (http://clamtk.sourceforge.net/) is a GTK-based GUI frontend for ClamAV. Install:

```
sudo apt-get install clamtk
```

AVG

AVG (http://free.avg.com/us-en/download.prd-afl) offers a free virus scanner for Linux in a .deb package. Download and install from the website.

Avast

Avast (http://www.avast.com/linux-home-edition) offers a Linux edition (for home users only) in a .deb package. Download and install from the website.

Anti-spam

Spam Assasin

SpamAssasin (http://spamassassin.apache.org/) is written in perl, and is mostly for use with a server (such as a groupware server or Apache). Install:

```
sudo apt-get spamassassin
```

Rootkit checkers

Rootkits (http://en.wikipedia.org/wiki/Rootkit) are malicious trojan (http://en.wikipedia.org/wiki/Trojan_horse_(computing)) -like programs to allow an intruder to become a root user and therefore have complete administrative control over the system. There aren't many rootkits in the wild for Linux. Still, this is a growing security problem (especially in other operating systems) and it is a matter of time before more rootkits appear in Linux. Checking for rootkits isn't always successful from a system that is already infected. Your rootkit checker should therefore be run from another system, or a USB pendrive with an Ubuntu LiveCD installation. See the rootkit checker manuals for instructions how to do this. If you are infected with a rootkit, you must backup all your files and re-install your system. (Thank goodness this is easy with Ubuntu, unlike with other operating systems).

Chkrootkit

Chkrootkit (http://www.chkrootkit.org/) checks locally for signs of a rootkit. See the chkrootkit manual (http://www.chkrootkit.org/README) for usage instructions.

Install:

```
sudo apt-get install chkrootkit
```

Run:

```
sudo chkrootkit
```

Rootkit Hunter

Rootkit Hunter (http://www.rootkit.nl/projects/rootkit_hunter.html) is compatible with (K)Ubuntu systems. See the usage instructions (http://sourceforge.net/docman/display_doc.php?docid=35179&group_id=155034) .

Install:

```
sudo apt-get install rkhunter
```

Run:

```
sudo rkhunter
```

Malicious commands to avoid

There are many malicious commands to be avoided in Linux (as in all operating systems). It is worthwhile to be aware of these dangerous commands so that they are not executed by accident or by malicious advice.

USB drives

USB drives are a major source of security risk and means of data theft.

- An administrator password should be set for the computer BIOS and booting from a USB drive or CD/DVD should be disabled. (Otherwise, any passerby can boot their own OS and then use it to steal data from the hard drive.)
- See this article (http://www.cyberciti.biz/faq/linux-disable-modprobe-loading-of-usb-storage-driver/) for methods of restricting USB usage to authorized users.

Prevent unauthorized boots and system access

Many computers are kept in places where casual passersby may have an opportunity to access the computer, unobserved for short periods. In addition to physical precautions to prevent or slow computer theft (such as locked cases, alarms, and security cables similar to those used to slow bicycle theft), precautions (http://www.pcworld.com/article/114727/lock_down_your_pc.html) should be taken to prevent an unauthorized operating system from being booted using an external device (such as USB drive). Once such as external OS is booted, it can be used to access most hard drive(s) on the computer and the contents copied to a second external device (to be examined or unencrypted later). This is a common means of data theft that is fast and easy to accomplish, and means to deter it should be taken on any public or semi-public computer.

- Set BIOS to restrict bootup to the hard drive only.
  - Set a Supervisor/Administrator password for your computer's BIOS. (I recommend writing it down and taping it to the inside cover of the computer case prior to locking the computer case.) Disable booting from all devices except the hard drive. Setting the hard drive as the first priority boot device is not enough, as most current BIOS menus allow manual selection of any enabled boot devices. Only the hard drive should be left enabled.
- Enable Hard Drive locking, if your computer's BIOS allows it. Most hard drives allow a password to be set by the BIOS and stored in a chip on the hard drive controller which can only be reset by disassembling the hard drive. (Some manufacturers provide a backdoor security key, however.) BIOS versions found on newer computers/laptops allow this password to be set in the BIOS, so that only a BIOS containing the correct password can unlock the hard drive. (If the hard drive is then removed from the computer, it cannot be accessed by any BIOS that does not have the correct password or backdoor security key.) Note, however, that this precaution does not protect against booting from external devices if the BIOS is still set to allow that.
  - There is a risk to this security measure. If you forget the password and the BIOS passwords somehow get reset, the hard drive would become inaccessible. The BIOS and Hard Drive password(s) should always be stored in a safe location.
- Password protect the Grub bootloader. Without password protection, Grub can be used to circumvent BIOS restrictions. See this section for Grub Legacy and this section for Grub2.
- Make sure all user accounts are protected by a password, and always require passwords for login. Never create an "administrator" user account (hidden or not) and leave it

unprotected by a password. Never enable automatic login without a password to any user account.

- It is possible to enable automatic login to a preferred password-protected user account while simultaneously enabling a password-protected screensaver (the password for which must still be entered even before initial user access). This is a reasonable solution that offers protection while still allowing automatic login.

- Make sure a password-protected screensaver is always enabled (that will engage after a reasonably short period of inactivity).

Network Monitors

There are two types of network monitors: those that monitor your own system's network settings and those that monitor network traffic. The latter includes security tools (that can also be used as hackers tools) for exposing security weaknesses in a network. Be aware and be safe! A list of available tools is at Top Ubuntu Security Tools (http://www.ubuntuforfree.com /top-ubuntu-security-tools/) .

Netstat

Netstat (http://www.faqs.org/docs/linux_network/x-087-2-iface.netstat.html) is the Linux command-line tool to monitor network status and functions. There are many usage parameters. See the manual for help.

```
netstat
```

Etherape (Network monitoring)

EtherApe (http://etherape.sourceforge.net/) is a graphical utility that allows you to see (in real-time) where connections are being made on your network, or between your network (or computer) and the Internet. If you are experiencing unexpected network activity on your computer or LAN and wish to see where the activity is occurring, this is an easy tool to use. Both "local" user and "root user" installations are created; in general you must use the root user installation to see all your network traffic.

```
sudo apt-get install etherape
```

List open files

Sometimes you will see your network slowing and want to know which files are sending data over ports. Use this command:

```
lsof -i -n -P
```

Nmap

Nmap (http://nmap.org/) is a free open source utility for network exploration (including showing open ports and running services) and security auditing. Also see these usage tips (http://www.linux-magazine.com/Issues/2006/62/Nmap-Methods) . Install:

```
sudo apt-get install nmap
```

Scan your own PC:

```
nmap localhost
```

(Once you have found out which ports are open, use a firewall to close the ones you don't want open.)

Nmap GUI

Install:

```
sudo apt-get install nmapfe
```

or you can try Zenmap:

```
sudo apt-get install zenmap
```

Nessus

Nessus (http://www.nessus.org) is a proprietary comprehensive vulnerability scanning suite that is free for personal, non-enterprise usage. See the website for details.

Snort

Snort (http://www.snort.org/) is the de facto open source standard for intrusion detection. Install:

```
sudo apt-get install snort
```

It can be used with an MySQL database (sudo apt-get install snort-mysql) or with a PostgreSQL database (sudo apt-get install snort-pgsql).

AcidBase

AcidBase (http://secureideas.sourceforge.net/) is an intrusion detection / basic analysis and security engine that uses Snort. Install:

```
sudo apt-get install acidbase
```

AppArmor

AppArmor (http://en.opensuse.org/AppArmor) is a set of security enhancements developed by Novell for SUSE Linux. It is installed in (K)ubuntu by default.

Disable AppArmor

AppArmor can prevent some services from running as expected and cannot be used in conjunction with SELinux. To disable it:

```
/etc/init.d/apparmor stop
update-rc.d -f apparmor remove
apt-get remove apparmor apparmor-utils
```

SELinux

SE Linux (http://en.wikipedia.org/wiki/Security-Enhanced_Linux) (Security Enhanced Linux) is an NSA (US National Security Administration) recommended set of tools for enhanced security in Linux systems. It enforces strict access controls (privileges) and is meant for mission-critical installations. It is not suitable for the casual desktop user. It was first available in Hardy Heron and is being updated for Intrepid Ibex. It is not compatible with AppArmor (which must first be removed).

```
sudo apt-get install selinux
```

Knockd (Port security)

Knockd (http://www.zeroflux.org/projects/knock) is a small server that listens for a pre-defined sequence of port opening attempts (a "knock") before opening an otherwise closed firewall port for communications. Install:

```
sudo apt-get install knockd
```

Network Management

Monitor your network or datacenter with a framework of utilities. Comparable to IBM Tivoli (which can cost thousands of dollars), these solutions are generally available as either community or enterprise editions.

- Hyperic (http://www.hyperic.com/products/open-source-systems-monitoring.html) is an open-source network monitoring framework that can be used in either a datacenter or a cloud environment (it is used for Amazon Cloud). Both a free community version and a subscription enterprise version are available.
- Groundwork OpenSource (http://www.groundworkopensource.com/community/community-edition.html) offers a community edition that integrates other packages such as Nagios, Nmap, and others. There is a subscription enterprise version as well. It has its

roots in a university setting.
- OpenQRM (http://www.openqrm.com/) is the GPL-licensed, free open-source community successor to the very popular network monitoring solution Qlusters. It is available (http://sourceforge.net/project/showfiles.php?group_id=153504) as a Debian/Ubuntu package. See the website for details.
- Canonical offers the Landscape (http://www.canonical.com/projects/landscape) network management service for $150 per node, with a free trial available.
- Zenoss (http://www.zenoss.com/) is a commercial network monitoring subscription package (about $150/node) with a limited free "core" edition also available.

Nagios

Nagios (http://www.nagios.org/) is a free open source network monitoring solution. It is administered from a web interface (http://localhost/nagios) and is expandable using a large number of available plugins. For additional configuration information, see the official Ubuntu documentation (https://help.ubuntu.com/10.04/serverguide/C/nagios.html) . Install:

```
sudo apt-get install nagios3
```

Munin

Munin (http://munin-monitoring.org/) is a free GPL-licensed open source networking monitoring tool based on RRDTool (http://en.wikipedia.org/wiki/RRDtool) , in which a master network node queries other network resources, cataloging and graphically displaying changes. It has a web interface and multiple plugins. For additional configuration information, see the official Ubuntu documentation (https://help.ubuntu.com/10.04/serverguide/C/munin.html) . Install (http://munin-monitoring.org/wiki/LinuxInstallation) :

```
sudo apt-get install munin
```

Cacti Monitoring Server

Cacti (http://www.cacti.net/) is a complete, free open source network graphing solution designed to harness the power of RRDTool (http://oss.oetiker.ch/rrdtool/) 's data storage and graphing functionality. Cacti provides a fast poller, advanced graph templating, multiple data acquisition methods, and user management features out of the box. It uses MySQL and PHP (part of the LAMP server stack). All of this is wrapped in an intuitive, easy to use interface that makes sense for LAN-sized installations up to complex networks with hundreds of devices. For more info see Cacti Server Setup (http://www.ubuntugeek.com/install-and-configure-cacti-monitoring-tool-in-ubuntu-810-intrepid-ibex-server.html) . Install:

```
sudo apt-get install cacti
```

Cluster SSH

ClusterSSH (http://sourceforge.net/apps/mediawiki/clusterssh/index.php?title=Main_Page) allows

replication of a command on an administration console to be replicated via SSH to multiple computers in a cluster. Install:

```
sudo apt-get install clusterssh
```

Enterprise Network Firewall

IPCop

IPCop (http://www.ipcop.org) is a free open source (GPL-licensed) firewall solution for use as an independent appliance (on a dedicated PC) in an enterprise network. It allows remote management and can protect multiple servers, including web and email servers. IPSec-based OpenVPN is supported. The CD image .iso and other files can be downloaded here (http://sourceforge.net/project/showfiles.php?group_id=40604&package_id=35093) . Installation instructions are on the website.

SmoothWall

SmoothWall Express (http://www.smoothwall.org/) is an award-winning, free, open source (with a GPL license) firewall solution for use as an independent appliance (on a dedicated PC) in an enterprise network. Download the installation CD .iso image here (http://www.smoothwall.org /get/) (server OS included), burn onto a CD, and install on a new, dedicated PC. Many features, however, such as VPN server, database access authentications, and content filtering are only implemented in a commercial version, however, and are not available in the community version.

Endian

Endian (http://www.endian.com/en/community/about/) is a very robust, free, open source universal threat management appliance similar to IPCop and Smoothwall. It also incorporates OpenVPN. Like Smoothwall, Dansguardian is used for content filtering (and is included in the community edition). Commercial and hardware versions with some additional features, automatic updates, and professional support are available. See the website for details.

LTSP (Thin client support)

LTSP (http://www.ltsp.org/) (the Linux Terminal Server Project) adds thin-client (http://en.wikipedia.org/wiki/Thin_client) support to Linux servers. The package is free, GPL-licensed, and the client can be used to run programs on either Linux or Windows LTSP servers. There is a module for classroom management (ltsp-controlaula) as well. Installation instructions are here (https://help.ubuntu.com/community/UbuntuLTSP/LTSPQuickInstall) . The alternate LiveCD can also be used to install a terminal server, as indicated in these instructions (http://www.ubuntu.com/products/whatisubuntu/serveredition/technologies/ltsp) .

LTSP Server

Install:

```
sudo apt-get install ltsp-server ltsp-manager
```

LTSP Client

Install:

```
sudo apt-get ltsp-client
```

iTALC (Thin client for Education)

iTALC (http://italc.sourceforge.net/) is a free, open source (GPL-licensed) thin client solution that supports both (K)Ubuntu Linux and Windows XP. It has been used widely in educational settings to monitor, share, and control multiple workstations. See the website for download and installation instructions.

Internet Cafe software

Internet Cafe (or CyberCafe) software is specialized LAN-administration software that includes time usage monitoring, billing, and administration. It can also be used in schools, libraries, and organizations with multiple monitored workstations requiring usage limits.

OutKafe

OutKafe (http://outkastsolutions.co.za/outkast/index.php?option=com_openwiki&id=outkafe) is a free, open-source, GPL-licensed cybercafe solution based on a postgreSQL database server stack. It is run on hundreds of sites. It is GTK-based but can be run with Kubuntu (KDE).

OpenKiosk

OpenKiosk (http://openkiosk.sourceforge.net/) is a free open source multi-platform server/client solution for administering and monitoring groups of workstations, such as in libraries, school labs, and internet cafes. Installation is from source files. See the website for details.

CafePilot

CafePilot (http://sourceforge.net/projects/cafepilot/) is a free multi-platform Java-based server/client solution for real-time monitoring and billing of Cybercafe workstations.

Miscellaneous solutions

This thread (http://ask.slashdot.org/story/10/04/11/188217/What-Advice-For-a-Single-Parent-As-Server-Admin?from=rss&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+Slashdot%2FslashdotLinux+%28Slashdot%3A+Linux%29) discusses several other solutions, including:

- Untangle (http://www.untangle.com/)
- m0n0wall (http://m0n0.ch/wall/)
- ClearOS (http://clearfoundation.com)

Pessulus (Lockdown Editor)

Pessulus is a GTK (Gnome)-based utility that allows an a computer administrator to restrict acccess to several administrative functions, including the command-line Terminal and many other functions. This is useful on public kiosk PCs, for example. Install:

```
sudo apt-get install pessulus
```

Cluster (cloud) computing

Cloud computing (http://en.wikipedia.org/wiki/Cloud_computing) is the co-ordination of many servers to maximise computing resources and efficiency. The use of virtual machines (http://en.wikipedia.org/wiki/Virtual_machine) , load balancing (http://en.wikipedia.org/wiki/Load_balancing_%28computing%29) , and VLAN (http://en.wikipedia.org/wiki/Virtual_LAN) technology are combined into an integrated system. Distributed computing and parallel processing underlies the networks of computers that are now used in a number of supercomputing applications.

OpenStack cloud

OpenStack (http://www.openstack.org/) is the technology currently used by Ubuntu for cloud computing as part of the Ubuntu Cloud Infrastructure (https://help.ubuntu.com/community/UbuntuCloudInfrastructure) . (Also see the Ubuntu community help (https://help.ubuntu.com/community/OpenStack) .) It is now included as part of Ubuntu server versions (starting with 12.04 LTS Precise).

- See the Ubuntu private cloud (http://www.ubuntu.com/cloud/private-cloud) information to set up an OpenStack cluster.

Eucalyptus cloud

Eucalyptus (http://eucalyptus.cs.ucsb.edu/) is a project from University of California Santa Barbara to facilitate cluster computing on servers that have the Xen virtual machine implementation enabled. Prior to 11.10 (Oneiric) it was available for the Ubuntu server edition as the Ubuntu Enterprise Cloud (https://help.ubuntu.com/community/UEC) .

- See the instructions for installing Eucalyptus on Debian systems (http://www.eucalyptus.com/download/eucalyptus/debian) .

Beowulf

The Beowulf (http://en.wikipedia.org/wiki/Beowulf_cluster) cluster computing project is one of

the earliest cluster computing examples and provides the underpinning for a number of Linux-based supercomputing clusters. A Beowulf cluster is designed to function like a single supercomputer, and can be scaled to any number of nodes. It uses open source components. See this introductory article (http://byobu.info /wiki/Building_a_simple_Beowulf_Like_Cluster_with_Ubuntu) on creating a Beowulf cluster with Ubuntu.

- OSCAR (http://svn.oscar.openclustergroup.org/trac/oscar) is a software platform that allows the creation of a Beowulf cluster on RedHat or Debian/Ubuntu Linux servers. See here (http://svn.oscar.openclustergroup.org/trac/oscar/wiki/repoTesting) for instructions on installing the .deb packages from repositories.

BOINC (Berkeley Open Infrastructure for Network Computing)

BOINC (http://en.wikipedia.org/wiki/Berkeley_Open_Infrastructure_for_Network_Computing) is middleware software developed at UC Berkeley (http://en.wikipedia.org /wiki/Space_Sciences_Laboratory) to allow multiple computers to operate as a grid-based (cloud based) supercomputer. There are over half a million computers participating in BOINC projects. To install BOINC (http://wiki.debian.org/BOINC) and participate in one or more of these projects:

```
sudo apt-get install boinc
```

A warning about distributed computing

Cloud computing is often mistaken for remote hosting. While cloud computing using public hosts may be beneficial in "farming out" a few of your non-sensitive computing needs, the recent ease of cloning filesystems and the promiscuity of datacenters has placed a great deal of sensitive data at risk when databases and critical server functions themselves are remotely hosted at a site not under your complete control. Even "trusted" banks and other large businesses routinely trade and sell our sensitive "private" data to multiple partners (sometimes for profit and sometimes unwittingly). Hosted servers are compromised on a daily basis and it is not very easy for an end customer to know how effective are the security practices of a remote hosting service. Further, any data left on public storage devices (cloud servers) in the US for more than 180 days are subject to search and seizure by government agencies there. Therefore, it is almost always more secure to host your own server(s) in house and to limit the traffic and access to your databases and servers to members of your own organization. Learning how to run your own servers is worth the effort, and powerful hardware on which to run them is inexpensive these days.

The Ubuntu cloud computing environment allows you to recruit the multiple computers within your own organization for distributed ("cloud") computing and thereby keep it all "in house" (behind secure firewalls). You do not need to expose your organization to insecure remote public hosts in order to use cloud computing.

Servers

Many server packages (such as Apache2, MySQL, PHP, etc.) can be installed individually, on either a Desktop edition or a Server edition (using the tasksel command described below). It is not necessary in general, therefore, to install Ubuntu Server if you only wish to use an occasional server package on a Desktop edition. Most of the instructions for individual server packages will work on the Server edition, on the Desktop edition, or on a Server edition that has had an Ubuntu or Kubuntu desktop installed on it.

Nevertheless, the Server edition is optimised for speed and ease of monitoring and maintenance when implemented in large networks and is therefore recommended. (For complete information see the Ubuntu Server Guide (http://help.ubuntu.com/12.04/serverguide/index.html) .) It is always possible to add an Ubuntu (Gnome) or Kubuntu (KDE) GUI desktop to an Ubuntu Server at any time.

- Download the latest Ubuntu Server ISO image from Ubuntu downloads (http://releases.ubuntu.com/precise/) .
- See this guide (http://help.ubuntu.com/community/BurningIsoHowto) for burning the ISO image to a CD.
- Use the CD for installation of the server.

(If you are attempting to create a dual-boot or multi-boot configuration with multiple operating systems on your computer, then see these tips.)

(Tip: During installation of the server, an initial user / password is created. Many servers are intended to run unattended with little subsequent intervention and it can be easy to forget the original user / password pair that is created at installation. I suggest writing this information down and taping it to the inside of the computer case cover for later reference. (Lock the computer case if you desire extra security.))

There are many server packages that are available to be installed as a one-step process during the Server edition installation process from the LiveCD, or at any time (on most editions) using the tasksel (http://wiki.debian.org/tasksel) command. For a list of server packages that can be installed using the tasksel command:

```
sudo apt-get install tasksel
sudo tasksel --list-tasks
```

or using a GUI list:

```
sudo tasksel
```

Ultimate Server Walkthrough

- Using instructions from Ubuntuguide, an ultimate server can be created with two wikis (MediaWiki), two Drupal websites, a Moodle online learning website, a BigBlueButton teleconferencing server, an Ubuntu desktop, and dynamic DNS access from the web. All components can be expanded and/or additional servers added.
  - Lucid ultimate server walkthrough.
  - Original Jaunty ultimate server walkthrough.

- To run multiple servers on multiple computers on a LAN using only a single IP address and router, see Reverse proxy Servers and Load Balancers.

Add a desktop to an Ubuntu Server

Packages that require server capabilities (such as Drupal with Apache, etc.) are often happier when a Server edition is installed as the base OS. However, adding a desktop can make the administration and maintenance of many packages easier for many users (albeit with a cost of reduced server speed). Add an Ubuntu (Unity or Gnome) or Kubuntu (KDE) desktop to a server using:

```
sudo apt-get install ubuntu-desktop
```

or

```
sudo apt-get install kubuntu-desktop
```

LAMP server installation

During server installation, you will have the option of installing a LAMP (Linux, Apache, MySQL, PHP) server stack. Many (but not all) open source servers use this integrated server stack. Drupal, for example, needs to have a LAMP server installed. If you intend to install a groupware server, however, make sure it is compatible with a LAMP server stack before choosing this option. Many groupware servers will install LAMP (or their own variation) automatically, so you do not need to install the LAMP stack. Others will install and use postgreSQL instead of MySQL, so you would not need to install a LAMP server.

Apache2 + MySQL + PHP

This is the preferred method:

```
sudo apt-get install tasksel
sudo tasksel install lamp-server
```

(Tip: During installation of the LAMP server, an initial MySQL "root" user password is created. This information will sometimes be needed when installing other server packages that use MySQL. I suggest writing the MySQL password down and taping it to the inside of the computer case cover for later reference. (Lock the computer case if you desire extra security.))

Other servers

During server installation, you can choose other servers to install, as well. These include a Mail server (Postfix with Dovecot), a DNS server (bind9), the OpenSSH server, a print server, a Tomcat Java web server, a Samba file server (for use with Windows networks), and a virtual machine host (Xen). Again, if you are using a groupware solution, you should be careful about installing these services, as they may conflict with similar (but competing) servers which the groupware

solution will install by default.

eBox (server and network manager)

eBox (http://www.ebox-platform.com/) is a web-browser based server management platform that is useful in managing multiple servers and networking functions in a small to medium business. It is modular so that as the network grows and more networking functions or servers (such as the ones listed below) are added, eBox can manage those, as well. Install:

```
sudo apt-get install ebox
```

OpenSSH server

OpenSSH allows encrypted communications through a designated secure port. See setting up an SSH server.

VPN Server

- See the section on VPN servers and the section on VPN clients.
- See OpenVPN help at the Ubuntu Server Guide (https://help.ubuntu.com/12.04/serverguide/openvpn.html) .
- Also see these tips for the OpenVPN server.

Mail Server

- See this section.

There are two methods for setting up a mail server.

- The dovecot-postfix package install the components and configuration files to use the Maildir (mail spooling) folder system by default. See Dovecot-Postfix Mail server.
- The mail-server task installs the components and configuration files to use the mbox (mail spooling) system by default. This can be installed:

```
sudo apt-get install tasksel
sudo tasksel install mail-server
```

Bind9 (DNS server)

BIND (http://en.wikipedia.org/wiki/BIND) DNS servers are the most commonly used on the Internet. Bind9 is the current edition. See the usage instruction here (http://www.bind9.net/manual/bind/9.2.5/Bv9ARM.html) . Also see the official Ubuntu documentation (http://help.ubuntu.com/12.04/serverguide/dns.html) for more configuration information. It can be installed using the tasksel option during installation of the Ubuntu server from the LiveCD, or at any time using:

```
sudo tasksel install dns-server
```

Apache Tomcat (Java server)

Tomcat (http://tomcat.apache.org/) is a free open source platform from Apache which provides a "pure Java" HTTP web server environment for Java code to run (see here (http://en.wikipedia.org/wiki/Apache_tomcat) for more info).

It is not part of the Apache2 web server. See the official Ubuntu documentation (http://help.ubuntu.com/12.04/serverguide/tomcat.html) for more configuration information. It can be installed using the tasksel option during installation of the Ubuntu server from the LiveCD, or at any time using:

```
sudo tasksel install tomcat-server
```

Xen virtual machine host

Xen (http://www.xen.org/) is a free open source virtualization platform that allows the host to run "guest" operating systems simultaneously (see here (http://en.wikipedia.org/wiki/Xen) for more info). Xen implementation in the (K)ubuntu server is based on integration with KVM (http://en.wikipedia.org/wiki/Kernel-based_Virtual_Machine) , the kernel-based virtualization platform in Linux. KVM integrates with QEMU (http://wiki.qemu.org/) components, which have been merged with Xen.

Note: KVM requires a 64-bit processor with a virtualization extension, i.e. an Intel VT (http://en.wikipedia.org/wiki/X86_virtualization#Intel_Virtualization_Technology_.28Intel_VT.29) or AMD-V (http://en.wikipedia.org/wiki/X86_virtualization#AMD_virtualization_.28AMD-V.29) CPU, therefore this package currently is successful only with the 64-bit Ubuntu server installation and on those CPUs.

It can be installed using the tasksel option during installation of the Ubuntu server from the LiveCD, or at any time using:

```
sudo tasksel install virt-host
```

Print server

Ubuntu uses the CUPS print server (http://help.ubuntu.com/12.04/serverguide/cups.html) , which is integrated into the desktop. Installing a print server in Ubuntu Server is necessary only if you do not intend to use a desktop (i.e. you intend a "headless" server). It can be installed using the tasksel option during installation of the Ubuntu server from the LiveCD, or at any time using:

```
sudo tasksel install print-server
```

OpenLDAP

OpenLDAP (http://www.openldap.org/) is a community-based LDAP (http://en.wikipedia.org/wiki/Lightweight_Directory_Access_Protocol) server that allows directory querying over TCP/IP, generally for organizations arranged by domain. Ubuntu uses the slapd daemon for the OpenLDAP server. See the official Ubuntu documentation (http://help.ubuntu.com/12.04/serverguide/openldap-server.html) for more information about installation and setup.

Proxy server

Squid

Squid (http://www.squid-cache.org/) is a widely-used proxy web server and web cache daemon that is useful for corporate or other large LANs that wish to accelerate and/or control traffic through the LAN. For initial configuration information, see the official Ubuntu documentation (http://help.ubuntu.com/12.04/serverguide/serverguide/C/squid.html) . Install:

```
sudo apt-get install squid
```

Privoxy

Privoxy (http://www.privoxy.org/) is a non-caching web proxy with advanced filtering capabilities for enhancing privacy, modifying web page data and HTTP headers, controlling access, and removing ads and other obnoxious Internet junk. It is easier to configure and more useful for individual users. Install:

```
sudo apt-get install privoxy
```

Reverse proxy Servers and Load Balancers

A reverse proxy (http://en.wikipedia.org/wiki/Reverse_proxy) server allows incoming web traffic on a LAN to be directed to multiple computers (each running one or more servers) on the LAN. When redundant instances of a server exist on a LAN, a Load Balancer (http://en.wikipedia.org/wiki/Load_balancing_%28computing%29) allows traffic to be directed to the most available instance.

Pound (Reverse proxy and load balancer)

Pound (http://www.apsis.ch/pound/) is a free, open source (GPL-licensed) lightweight reverse proxy and load balancer. Also see the Ubuntu Community (https://help.ubuntu.com/community/Pound) instructions. Install:

```
sudo apt-get install pound
```

Apache Reverse proxy

The Apache2 server has a mod_proxy (http://httpd.apache.org/docs/2.2/mod/mod_proxy.html#proxypass) module available that enables reverse proxies. See these

instructions for a simple method to implement reverse proxies using this Apache module.

Control panels

There are several free and/or GPL-licensed control panel utilities for managing multiple servers on a single physical server or cluster of servers running Debian/Ubuntu-based servers. Here (http://www.techmixer.com/best-free-web-hosting-control-panel-to-manage-web-hosting/) is a brief overview.

- Webmin (http://www.webmin.com/) is the most widely used web browser-based free open source web hosting control panel for Linux.
- GNUPanel (http://gnupanel.org/) is a free GPL-licensed web hosting control panel system that is compatible with Debian/Ubuntu OS using PHP.
- Web-cp.net (http://www.web-cp.net/) is a free GPL-licensed web hosting control panel system that is compatible with Debian/Ubuntu OS using PHP.

Media servers

See this Linux Planet (http://www.linuxplanet.com/linuxplanet/reviews/7313/1) article recommending open source Linux media servers, including MediaTomb (http://mediatomb.cc/) (also see Ubuntu Community help -- MediaTomb (https://help.ubuntu.com/community/MediaTomb)), Jinzora (http://sourceforge.net/projects/jinzora/) (also see here (http://www.maketecheasier.com/how-to-install-and-setup-jinzora-media-server-in-ubuntu/2008/08/25)), Wizd (http://wizd.sourceforge.net/) , Firefly (now forked as forked-daapd (https://launchpad.net/ubuntu/+source/forked-daapd)), and MythTV.

Network Attached Servers

- Here are some user-contributed suggestions regarding commercially available NAS/RAID devices.

FreeNAS

FreeNAS (http://www.freenas.org/) allows a PC with several hard drives to function as a self-contained network attached storage RAID device. It is a very small, fast system, so that an older PCs could function quite well as an NAS.

Setup RAID in Ubuntu/Kubuntu

See this thread (http://ubuntuforums.org/showthread.php?t=408461) for a discussion how to set up RAID on an Ubuntu/Kubuntu server.

Databases

There are several free enterprise-strength databases that can be used in (K)Ubuntu Linux.

PostgreSQL

PostgreSQL (http://www.postgresql.org/) is a free standards-compliant enterprise-strength open-source database, initially developed at UC Berkeley. See the PostgreSQL Server documentation (http://www.postgresql.org/docs/8.4/static/admin.html) for server configuration information. Install using the dummy task:

```
sudo apt-get install tasksel
sudo tasksel postgresql-server
```

or install directly:

```
sudo apt-get install postgresql-8.4
```

or

```
sudo apt-get install postgresql
```

MySQL

MySQL (http://en.wikipedia.org/wiki/MySQL) is one of the most widely-used relational databases, and has been licensed under the GPLv2. It has now been bought by Oracle as part of the purchase of Sun. It has long been integrated into co-ordinated server platforms using the LAMP stack, but it can also be installed separately.

```
sudo apt-get install mysql-server
```

MariaDB

Since the purchase of MySQL by Oracle, an effort to maintain a true community-driven replacement for MySQL has emerged in the form of MariaDB (https://mariadb.org/) , whose lead developer is the founder of the original MySQL. It is touted as a drop-in replacement for MySQL on a verion-by-version basis. (See this comparison (https://kb.askmonty.org/en/mariadb-versus-mysql-compatibility/) .) Installation is from the MariaDB repositories (https://downloads.mariadb.org/mariadb/repositories/) . For example, to install MariaDB version 5.5:

```
sudo apt-get install python-software-properties
sudo apt-key adv --recv-keys --keyserver keyserver.ubuntu.com 0xcbcb082a1bb943db
sudo add-apt-repository 'deb http://ftp.osuosl.org/pub/mariadb/repo/5.5/ubuntu precise main'
sudo apt-get update
sudo apt-get install mariadb-server
```

Note: Key servers often use port 11371. Make sure your firewall allows port 11371 to be open.

- For troubleshooting information, see this page (http://kb.askmonty.org/en/installing-mariadb-deb-files/) and this page (http://stackoverflow.com/questions/16214517/installing-mariadb-unmet-dependencies-mariadb-server-5-5) .
- This page (http://yaui.me/mariadb-how-install-ubuntu-12-04-lts/) includes these steps to add required dependencies:

```
sudo apt-get install libmariadbclient-dev libmariadbclient18 libmariadbd-dev libmysqlclient18 mariadb-client
sudo apt-get install mariadb-client-5.5 mariadb-client-core-5.5 mariadb-common mariadb-server mariadb-server-5.5
sudo apt-get install mariadb-server-core-5.5 mariadb-test mariadb-test-5.5 mysql-common
```

```
sudo /etc/init.d/mysql start
```

- This page (http://eureka.ykyuen.info/2013/01/25/mariadb-installation-on-ubuntu-precise/) recommends immediately securing the database: "Secure MariaDB by the mysql_secure_installation command and configure:"

```
Remove anonymous users? [Y/n] Y
Disallow root login remotely? [Y/n] Y
Remove test database and access to it? [Y/n] Y
Reload privilege tables now? [Y/n] Y
```

Tips & Tricks

Run Command

You can run any application in your path using the Run Command. Use Alt+F2.

Turn off Hot Keys

This is the most evil option on any operating system, in my opinion. A mis-stroke enables any number of random events. Unfortunately, this problem is pervasive in operating systems and is difficult to turn off.

> Menu -> System -> Administration-> Advanced -> Input Actions -> General Settings -> check "Disable KHotKeys daemon"
>
> Menu -> System -> Administration-> Advanced -> Input Actions -> Gestures Settings -> check "Disable mouse gestures globally"

If you wish to be selective about it (this doesn't often work, however), start by disabling unnecessary desktop hotkeys.

> Menu -> System -> Administration-> Advanced -> Keyboard & Mouse -> Keyboard Shortcuts

Also, you may want to deactivate linking gestures to sticky and slow keys:

> Menu -> System -> Administration -> Accessibility -> Activation Gestures -> uncheck "Use gestures for activating sticky keys and slow keys"

Note: You probably will have to disable hotkeys in many applications, as well.

Hotkeys from the Synaptics Touchpad can be selectively turned off using this information from the Ubuntu documentation (https://help.ubuntu.com/community/SynapticsTouchpad#Ubuntu) .

Associate default applications

- To assign the default DVD player (make sure you have enabled DVD playback capability first:

  Menu -> System -> Administration-> Advanced -> File Associations -> x-content -> video-dvd -> Applications Preference order -> Add...

  then choose your favourite media player. There are similar options for Blu-Ray (video-bluray) and HD DVD (video-hddvd). Set each individually.

- To assign the default player for playing mpegs (or other video formats):

  Menu -> System -> Administration-> Advanced -> File Associations -> video -> mpeg -> Applications Preference order -> Add...

  then choose your favourite media player. You can do this for a host of video file formats, including .wmv (x-ms-wmv, or Microsoft WMV format), .flv (x-flv, or Flash video), quicktime, and so on.

- To assign .pls audio streams to play through Audacious:

  Menu -> System -> Administration-> Advanced -> File Associations -> audio -> x-scpls -> Applications Preference order -> Move Audacious to the top (or Add... it).
  Make sure *.pls appears in the Filename Patterns section.

Automatic user login

- To accomplish this (yet still require a user password):

  Menu -> System -> System Settings -> Login Manager -> Convenience -> Enable Auto-Login (*ticked*) -> Lock session (*ticked*)
  -> Pre-select user: Specified: *Choose primary user*

- This ought to be combined with a password-protected screensaver.

Autostart a program at bootup

Any program (or script) can be made to Autostart at bootup by creating a symbolic link to that program (or script) in the ~/.config/autostart folder.

For example, to start Firefox at bootup, create a symbolic link:

```
sudo ln -s /usr/bin/firefox ~/.config/autostart
```

Choose Bootup/Startup services

Preventing unneeded or unwanted services from loading at startup can improve system performance.

- Install the GTK-based Bootup-Manager:

```
sudo apt-get install bum
```

- Run Bootup-Manager:

  Menu -> System -> Bootup-Manager

Run a script from a menu item

It is possible to place a short script in a menu item / shortcut to answer an interactive query (such as a password query). Here is an example that is used to enter a password during an SSH negotiation. First, install the utility expect (http://linux.die.net/man/1/expect) :

```
sudo apt-get install expect
```

The use a command in the Menu Item / Shortcut similar to:

```
expect -c 'spawn ssh -l sshuser -L 5900:127.0.0.1:5900 remoteserver.remotedomain.org -p 22 ; expect assword ; send
```

In this example the password *sshpassword* is returned when the ssh program requires a password. Expect waits for some text to be displayed in the command-line terminal then returns text in return. The Menu Item must be "Run in terminal", therefore.

SHC (Encrypt scripts)

SHC (http://www.datsi.fi.upm.es/~frosal/) is a simple script compiler that will convert a script into a binary, obscuring the code (and passwords, etc.). Usage instructions are here (http://www.datsi.fi.upm.es/~frosal/sources/shc.html) . Install by adding the Debian Etch repository:

```
sudo add-apt-repository 'http://archive.debian.org/debian etch main'
```

then install the shc package:

```
sudo apt-get install shc
```

Capture a screenshot

See this tutorial (http://tips.webdesign10.com/how-to-take-a-screenshot-on-ubuntu-linux) .

Customize desktop to look like KDE

In recent versions of Ubuntu, the Gnome desktop can be made to resemble the cleaner KDE desktop with some customization. (Customizations are highly personal, and this section represents preference only.)

- See Desktop Customization.

Run a KDE 4 desktop from Ubuntu

It is possible to install the KDE4-based desktop (the default in Kubuntu) in Ubuntu.

```
apt-get install kubuntu-desktop
```

There is a risk of software bloat and some incompatibilities between modules when doing this. At login, you can choose (as an option) whether to start the KDE (Kubuntu) desktop or the Gnome (Ubuntu) desktop. Nevertheless, when there are two modules trying to perform the same function (one from each desktop), it is possible to have conflicts.

Run a KDE 3 desktop from Ubuntu

You can also install the older KDE 3 desktop on Lucid, or almost any KDE3 application.

- Add the following KDE 3 repositories:

```
sudo add-apt-repository ppa:kde3-maintainers
```

- Install KDE 3.5 desktop:

```
sudo apt-get update
sudo apt-get install kubuntu-desktop-kde3
```

- To install any KDE3 app, append "-kde3" suffix to package name. See Pearson Computing (http://apt.pearsoncomputing.net/) for additional details.

Kill (end) a process

- There are many tricks to try to fix a frozen PC. Press Alt+F2, and use killall to end the frozen application. Example:

```
sudo killall amarok
sudo killall firefox
```

- In order to terminate a stuck graphical application use the xkill utility. Press Alt+F2, type xkill, and press Run. Point the cursor to the application you want to kill and press the left

mouse button. This should kill the selected application.

```
xkill
```

- Another trick to try is pressing AltGr+SysRq+K (RightAlt+PrintScreen+K). This will log you out. But, what happens if this does not work? Try pressing Ctrl+Alt+F1,login, enter your password and run:

```
sudo killall gdm
sudo startx
```

View hidden files

In the Nautilus file manager, press:

```
Ctrl+ H
```

Mute notifications (alerts)

- Notifications (alerts) can be disabled:

  Menu -> System -> Preferences -> Sound -> Sound Effects -> Sound theme: -> *No sounds* -> Close

- GNOME notifications (alerts) are associated with sounds by default. This can also be disabled separately:

  Alt-F2 -> gconf-editor -> /apps/indicator-sound -> volume_mute (*ticked*)

- Turn off login notification sound:

  Menu -> System -> Preferences -> Startup Applications -> Startup Programs -> GNOME Login Sound (*unticked*) -> Close
  -> Menu -> System -> Administration -> Login Screen -> Unlock -> Play login sound (*unticked*) -> Close

Filenames with spaces

- Filenames or folder names with spaces in them should be enclosed with parentheses (" "). For example, to change to a directory named "This Dir" or "/home/This Dir", use the command:

```
cd "This Dir"
```

or

```
cd /home/"This Dir"
```

- Alternatively, a space in a filename or folder name can be preceded with a backslash. For example, to change to a directory named "This Dir" or "/home/This Dir":

```
cd This\ Dir
```

or

```
cd /home/This\ Dir
```

Alien

Alien (http://kitenet.net/~joey/code/alien/) is a method for converting (Red Hat) .rpm packages into (Debian) .deb packages. It is not reliable and converted packages must be tested extensively for functionality, with line changes often required. It is often more reliable to create (Debian) .deb packages from source, and even the Alien software maintainers do not recommend using Alien for important packages. To keep alien from changing the version number, use the following command

```
alien -k rpm_file_name.rpm
```

Convert the package.rpm into a package.deb

```
alien -d package-name.rpm
```

Convert the package.rpm into a package.deb, and install the generated package

```
alien -i package-name.rpm
```

To convert .rpm to debian

```
sudo alien -k *.rpm
```

Software Troubleshooting

Permissions error on program startup

If you get a permissions error, try the following:

```
sudo chown -R user /home/user
```

Note: Replace *user* with the actual username. This command changes the owner of the folder /home/*user* to *user*. -R means "recursively", i.e. including all subfolders.

CD-ROM Troubleshooting

If you receive the "cdrecord has no permission to open the device" error while burning using a CD burner, open a terminal and type:

```
sudo chmod 777 /dev/scd0
```

Note: replace "/dev/scd0" with your own device.

Note: chmod 777 is the universal option for granting full permission to a folder. The 777 mask indicates that read, write, and execute permission is given to all users.

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... and plant some trees.

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